To J. N. Jenkins, in appreciation of his excellent mechanical work and courteous helpfulness in setting up the "guillotine" in the Columbia laboratory.

A. L. Crane

March 6, 1925.

RACE DIFFERENCES IN INHIBITION

BEING

A Psychological Study of the Comparative Characteristics of the Negro and the White Man as Measured by Certain Tests, with Especial Reference to the Problem of Volition.

BY

ALBERT LOYAL CRANE

ARCHIVES OF PSYCHOLOGY

EDITED BY R. S. WOODWORTH

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The writer desires to acknowledge his indebtedness to Dr. H. J. Pearce, President of Brenau College, Gainesville, Georgia, and to Dr. Herman M. Adler, Director of the Institute for Juvenile Research of the City of Chicago, for the privilege of the use of the buildings of their respective institutions for the purposes of this experiment; and also to Prof. R. S. Woodworth for that subtle inspiration and encouragement without which this work might well never have been.

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PREFACE

Finding ourselves at the time that this problem was undertaken on the faculty of Brenau College, Gainesville, Georgia,—in the heart of Dixie,—it seemed almost foreordained that the same should concern itself with some aspect of the psychology of the negro. The simple and obvious undertaking would have been to have continued in further detail the study of the quantitative intellectual differences between the two races as measured by intelligence tests. Illuminating as such work may be, however, it nevertheless seemed to the present writer that no amount of effort along the lines of the measurement of intelligence could ever adequately describe the psychological differences between the negro and the white man. Let us illustrate: Suppose we were to select two groups of whites whose intelligence bore to each other the identical quantitative relationship that exists between the intelligence of an average white group and an average black group,—would not most of us concede that, in their fundamental psychology, the two white groups still resembled each other far more closely than did the average white group and the average black group?—Surely then, if the existence of a non-intellectual difference between the two racial groups can be experimentally demonstrated, it will not only be a fact of considerable theoretical interest to the psychologist but should also prove of immediate practical value to those concerned with the actual handling of the negro.

Proceeding from these premises, the attempt was made to measure the power of volition in the two racial groups, employing as subjects 100 unselected negroes and a similarly unselected control group of 100 whites,—50 men and 50 women in each case. Only the fellow scientist who has attempted to induce one hundred Southern darkies to offer themselves as subjects in an experiment of this sort can have any conception of the difficulties involved in actually getting the subjects into the laboratory. Threats, cajolery, flattery, bribery and every other conceivable ruse within the bounds of reason and the law were resorted to in order to bring the number of

subjects tested up to the desired hundred. During the course of the four months in which the writer was attempting to entice negroes into his laboratory, he gladly provided vocal solos for negro churches, harangued Thanksgiving meetings and delivered formal graduation addresses at negro commencements; but the scheme which proved most productive of subjects was the establishing of a flat fee of 50 cents to all who would offer themselves as subjects and adding thereto the offer of transportation from and to their homes in a rickety old Ford hired for the purpose. To that old Ford and the outlay of a few dollars in "fees" the writer attributes his success in ultimately obtaining 100 negro subjects. It was a never-to-be-forgotten experience, the humor and zest whereof, however, more than compensated for the many weary and discouraging hours which it cost to witness a subject fleeing over the hill in fright or reversing decision on the foot of the laboratory steps at the last moment.

The testing of the white control group was, for the most part, carried on while the writer was a member of the staff of the Institute for Juvenile Research of the City of Chicago, one year—during which it was impossible to carry on the work—having intervened since the testing of the negroes. The difficulties in the way of getting white subjects, while considerable, were by no means comparable to the difficulties experienced in obtaining the negroes. Moreover, such difficulties as did arise sprang rather from the fact that the average adult white possesses little or no sympathy with the scientific point of view and that, his time being generally pretty well taken up, he is little inclined to go out of his way for a reason which he so vaguely grasps and with which, at best, he has but little sympathy. However, a properly directed appeal to an average white gathering seldom failed to net a satisfactory number of volunteers.

The illustrations in the text were all made in the South. In setting up the apparatus anew, however, every care was exercised to reproduce as accurately as possible the conditions of the original laboratory; and, so similar was the final aspect of the Northern laboratory to its Southern original, that it may be unhesitatingly said that the differences introduced into the experiment by its having been transplanted from one laboratory to another are entirely negligible.

As the reader will observe in perusing the text, every effort

was made to study the negro as a psychological unit; and, although the central problem of the study concerns itself with volition, the interest in the negro is by no means limited to that field alone. On the contrary, wherever either our experimental procedure or our personal contact with the negro appears to have furnished us with the opportunity to draw valid conclusions in other aspects of our subject, we have yielded to the temptation to record our observations,—which the reader is at liberty to accept for what he deems them worth.

A. L. CRANE.

Chicago, Illinois.
Spring, 1922.

Race Differences in Inhibition

CHAPTER I

INTRODUCTION

On pages 123 and 124 of Ferguson's "Psychology of the Negro" published in the "Archives of Psychology" (Columbia University Contributions to Philosophy and Psychology, Volume XXV, No. 1) we find the following:

"In the present state of the advancement of science it does not seem possible to make adequate tests of those vastly important qualities which are included in the feeling and dynamic, rather than in the intellectual, side of mental life. It is the common opinion that the negro differs more from the white in such traits than in intellect proper. His emotions are generally believed to be strong and volatile in their manifestations; whether this is due to their intrinsic nature or to a lack of restraint is an untouched problem. Instability of character is ascribed to the negro, involving a lack of foresight, an improvidence, a lack of persistence, small power of serious initiative, a tendency to be content with immediate satisfactions, deficient ambition. But the evidence that such characteristics constitute a true racial difference cannot be called conclusive, and the psychological causes underlying them have not been adequately investigated. Along with high emotionality and instability of character, defective morality is held to be a negro characteristic. This is as subject to debate as are the other qualities, though it is apparently supported by social statistics. It may be that the total circumstances of his life are such as would lead to immorality even were the negro possessed of the psychic nature of the white man.

"On the other hand, while it is impossible to arrive at an exact knowledge of the relative amounts of such important but intangible traits in the two races, it must be said that the evidence of experience and observation cannot be disregarded. Such evidence is often wholly unscientific and worthless, but not always so. Strong and changing emotions, an improvident character and a tendency to immoral conduct are not unallied. They are all rooted in uncontrolled impulse. And

a factor which may tend to produce all three is a deficient development of the more purely intellectual capacities. Where the implications of ideas are not apprehended, where thought is not lively and fertile, where meanings and consequences are not grasped, the need for the control of impulse will not be felt. And the demonstrable deficiency of the negro in intellectual traits may involve the dynamic deficiencies which common opinion claims to exist."

It is with the issue here raised that the present study primarily concerns itself. Namely: What is the psychological explanation of the impulsiveness, improvidence and immorality which the negro everywhere manifests?

Before proceeding further, let us analyze the mental processes which occur in any ordinary act of inhibition. Firstly, there must be something to be inhibited, i.e., there must be a "drive." This drive together with the mechanism for its consummation constitutes the *instinctive* factor. Secondly, there must occur the intellectual recognition of some distant good more desirable to the individual than the good to be obtained by the successful consummation of the aforementioned drive. This we may call the *intellectual* factor. It is obviously a sine qua non to the occurrence of any act of inhibition. Thirdly, and lastly, there must occur as the result of the intellectual recognition of the undesirability of permitting the original drive to achieve its consummation, the substitution of some other activity incompatible, in a motor way, with the activity to which the original drive was directed. This is the *volitional* factor in inhibition; and, as we are reminded by McDougall, this substituted activity depends for its motive force upon the cooperation of impulses excited within the system of the self-regarding sentiment.

At this juncture it may be well to consider for a moment McDougall's implied contention[1] that there is no such thing as inhibition,—that it is merely the negative aspect of a positive excitation. While it is undoubtedly true that inhibition is accomplished in this indirect manner, there is something repugnant to reason and to all introspective experience in relegating inhibition to this very incidental role in mental life. What the average man means by inhibition is too real and vital a process in his everyday experience to be thus regarded. If, then, we accept as correct that mechanistic explanation which regards

[1]Social Psychology, 6th Edition, pgs. 245 et ff.

inhibition as the negative and incidental aspect of a positive volitional act, what can we say in defense of our contention that inhibition as we commonly experience it is in itself a positive psychological act instigated in its own behalf?

It would seem to the present writer that the solution to this apparent dilemma is to be found in this comparatively simple distinction: While the state of mind which we might designate as the inhibitory state is unquestionably characterized by the presence of a positive voluntary activity whose motor expression is incompatible with the act which is being inhibited, it cannot be denied that this positive voluntary activity has been called into functional activity, either consciously and deliberately or unconsciously through habit, for the express purpose of shunting off the track and preventing the consummation of the drive which the intellect of the individual has informed him is not in keeping with his best interest. Thus, while it is very probably true that the architectonics of the human nervous system is such as to make it impossible for a human being to inhibit any impulse except through the above-described roundabout method of substitution[1], it is equally true that in genuine inhibition the substituted activity is not *primary* in the mental state in question,—even though we may admit that it is *predominant.* It has only been called into existence to accomplish the function of inhibition. It is this that characterizes the truly inhibitory state of mind. On the other hand, it must be recognized that there arise in the course of every day's life a myriad of embryonic impulses of little or no dynamic quality which never achieve fulfillment because of that very fact of the anatomy of our nervous systems—referred to a few lines above—which makes it impossible for us to do more than one thing at a time. These impulses, it is true, are automatically *suppressed,*—but they are not *inhibited,*—and this suppression may truly be regarded as a negative and incidental aspect of whatever incompatible activity may chance to be dominant at the moment of their arisal and death. However, the mental state attendant upon this automatic suppression is a much more passive one than the vigorous mental state characteristic of true inhibition. It would seem that McDougall has confused these two

[1]See Sherrington's "Integrative Action of the Nervous System" (Yale University Press '06) section on reciprocal inhibition, pages 83 and following.

processes, and, in the confusion, has failed to correctly analyze the genesis and mechanism of *inhibition* which should be carefully distinguished in the terminology from *suppression*—a distinction which, to date, does not appear to have been made.[1]

To return from this digression to the problem in hand: What is the psychological explanation of the alleged improvidence, impulsiveness, etc., of the negro? Having now before us a working theory of the nature of the inhibitory process, we may immediately proceed to answer our own question as follows: The negro may be more impulsive than the white man for any one of the three following reasons (or for any two or all three of these reasons operating together) :—(1) Because his instinctive impulses are stronger. In view of the probably less highly evolved nature of the negro's nervous system,[2] this is not an unlikely assumption.—(2) Because his inferior mentality fails to recognize the greater good to be obtained by inhibiting his present desire, thus failing to afford the mind with any occasion whatsoever for inhibition,—or we may say that the negro is impulsive (3) Because he lacks the power to reinforce the substituted incompatible activity to a sufficient degree to prevent the original impulse from breaking through and achieving its consummation.

Proceeding upon this basis, an attempt was made to create an experimental situation calling upon the subject to exercise his powers of inhibition under conditions in which the instinctive drive would be in all cases so intense as to approach equality among the entire group of subjects, while the recognition of the good to be obtained was so simple and obvious as to be perfectly accomplished by the dullest mind. Theoretically, at least, this compels us to interpret the performance of the subject as a measure of his volitional (or inhibitory) ability.

The description of how this attempt was carried out is given in Chapter II, whereas all theoretical speculation concerning the significance of the findings is reserved until after the presentation of the data.

---

[1]The following excerpt from James' "Psychology," Vol. II, pg. 527, would seem to indicate that the distinction here made was recognized as valid by James, though he places little or no emphasis upon it: "It may be remarked in passing, that the inhibition of a movement no more involves an express effort or command than its execution does. Either of them *may* require it."

[2]On this disputed point, see controversy in the American Journal of Anatomy between Robert Bennett Bean (Vol. V, pages 353 to 423) and Franklin P. Mall (Vol. IX, pages 1 to 32).

As the experiment proceeded, the writer's interest developed from the restricted problem to which he originally addressed himself into an interest in the general understanding and description of the negro as a psychological unit; and, throughout these pages, the reader will note numerous observations of varying interest and import which have thrust themselves upon him en passant,—and which it has been deemed unwise to omit.

CHAPTER II

Apparatus and Tests

As the reader has already deduced, the apparatus which is required to meet the exigencies of the present problem, namely: How does the negro compare with the white man in power of inhibition?—must embody the three following characteristics:—(1) It must present to the subject a situation in which the instinctive impulse to be inhibited is of such intensity as to approach practical equality among all persons, (2) The intellectual recognition of the good to be obtained by a successful inhibition must be made so exceedingly simple and devoid of complexity as to be readily and regularly accomplished by all minds from the dullest to the most brilliant, and (3) There must be some device which shall record with mechanical accuracy the performance of the subject in response to the test. What shall such an apparatus be?

Casting about for some device that should fulfill these requirements, numerous possibilities came to mind,—most of them time-worn and tried, such, for instance, as measuring an individual's ability to inhibit the eye wink in response to a brilliant flash of light or observing how well he should inhibit the general start of the body in response to the firing of a pistol, etc., etc. At first thought it would appear to be possible to so modify some one of this category of tests as to constitute it a fairly satisfactory measure of an individual's power of inhibition. On further consideration, however, it soon became clear that no such test could ever fairly measure the mental trait in which we were interested. One need not strain his credulity in order to appreciate the fact that a man who was perfectly well able to control his impulses and desires might exhibit far less control over the behavior of his eyelid than some spineless weakling whose control over his facial musculature might chance to be almost absolute.

What, then, is the trouble with such tests? And how shall we alter them so as to constitute them satisfactory tests of the trait in question? Obviously they are too physiological

and not sufficiently psychological. Or, to express it in terms of the neurone theory, the path involved does not reach a sufficiently high level of the cerebro-spinal axis. Such tests may have their proper place as trade tests to be given candidates for aerial service or some similar type of activity for which the candidates' physiological qualifications are of prime importance; but as measures of an individual's power of inhibition they cannot be seriously considered,—for, without attempting to "localize" this power of inhibition, it is obvious that it is a cerebral and not a spinal function.

It must be confessed that, from a strictly theoretical standpoint, an absolutely satisfactory circumvention of this difficulty does not appear to be possible. Clearly, an individual's power of inhibition can only be subjected to laboratory measurement by recording his ability to immobilize some portion of his anatomy when the same is impelled to execute some constant movement in response to an adequate and readily controllable stimulus. In this situation, the best that can be done is to employ a stimulus both the appreciation of which and the motor response to which shall traverse neural tracts whose connection with the pre-central gyrus is so exceedingly intimate as to justify the conclusion that the individual's failure to inhibit that reflex is an indication of his correspondingly lesser degree of control over the motor areas of his cortex.

Fig. 1 illustrates the mechanism which was finally devised and employed in the tests which constitute the basis of this research. We shall present here in some detail a description of the apparatus itself, reserving to the chapter on procedure a statement of the precise manner in which the apparatus was employed together with an explanation of how the various requirements which our apparatus must fulfill—set forth on pages 14 and 15—have been met and embodied therein.

Two vertical standards eight inches apart made of T iron rising seven feet from an ordinary three-foot table to the ceiling of a ten-foot room, together with a sliding weight, constitute the outstanding feature of the apparatus. Between the standards at the top is a device upon which the weight may be caught. The little catch spring on the upper edge of the weight by means of which it grasps the suspending device is clearly shown in the figure. The essential feature of this device is a piece of highly tempered steel which is so placed as to lie directly in the magnetic field of a copper wire coil. This

coil is connected with the city wires supplying the usual 110 volt alternating current. A simple telegraph key constitutes the control for this circuit. When this circuit is closed, the steel core of the suspending device acts as an electro-magnet. By means of a very simple lever, this electro-magnet is made to release the weight in response to the touching of the key.

The weight itself, although painted black and marked "10 LBS." in ominous silver letters, is really made of wood and weighs only three pounds. It is slotted on either side to receive the flanges of the T iron standards between which it falls almost without friction.

Careful inspection of Figs. 1 and 4 will reveal the simple but reliable method employed to bring the now rapidly moving weight to a sudden standstill at a safe distance above the hand board. On either side of the base board in the angle between the flange and the rear half of the body of the T iron is a cylindrical opening three-quarters of an inch in diameter and an inch and a half deep. The bottom of these openings is guarded by a neatly fitted piece of pure soft rubber. Into these openings fit the two steel plungers shown in the figure. Each of these plungers is so moulded at its upper end as to accommodate an ordinary bottle cork. By means of this combination of

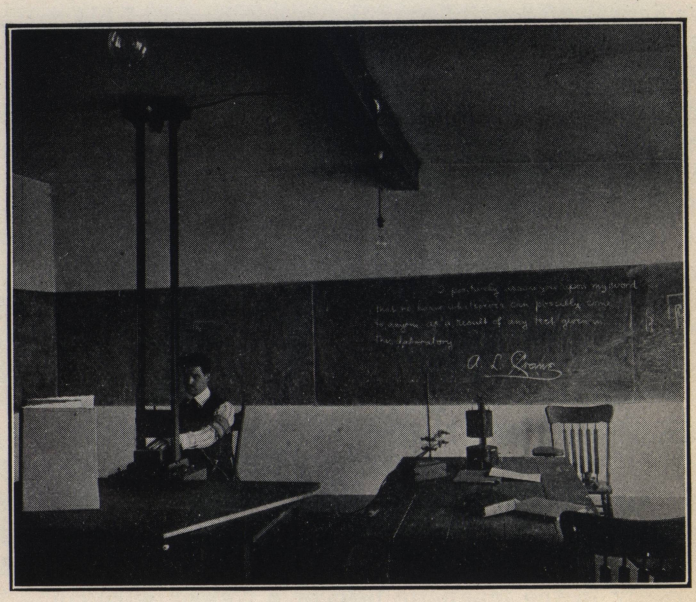


Fig. 1.

rubber, steel and cork, the shock of the falling weight is so distributed as to make it possible to secure an effective stoppage of the weight without smashing it to bits during during the course of the first few dozen trials.[1]

Between the standards at the bottom is a wooden block six inches high. This hand block in reality consists of two pieces of wood, the lower one five and a half inches high, and the upper one, half an inch thick, superimposed upon it,—so that to all outward appearances the entire block is perfectly solid. Between the upper and lower blocks, however, are two sets of copper strips. These strips are connected with the positive and negative poles of a series of ordinary dry cell batteries. The upper board which shuts these strips out from view is nailed on to the lower block by silver-headed tacks. These tacks, in turn, are so arranged as to make it impossible for a person to place his hand upon the hand board without completing the circuit between some one strip connected with the positive pole of the batteries and some other strip connected with the negative pole. The top of the block is finished with an aluminum paint, thus, to some degree, rendering the tacks less noticeable and giving a metallic appearance to the top of the block. Upon close inspection of Fig. 1 one may distinguish two metal contact strips extending about two-fifths of the way up the rear of the standards. The circuit employed in the hand board is led off through these strips. Two little spring contact strips also made of copper are attached to the sides of the weight and to each other by a wire passing through the body of the weight. These are so arranged that when the weight falls they slide over the contacts on the back of the standards and, if the switch in this circuit be closed, a current will pass through the hand of the subject just as the weight is traversing the last portion of its course. The current which passes through the subject's hand, however, does not come directly from the batteries, but is first led through an ordinary small medical induction coil, thus transforming it into an induced vibrating current. The intensity of this current passing through the hand is so low that the great majority of the subjects, in the excitement of the test, fail to recognize its electrical nature. With some subjects it creates the illusion that the weight has actually hit them. Others, entirely dis-

[1]Credit for the solution of this mechanical difficulty is due the C. H. Stoelting Co. of Chicago, who carried the writer's designs into effect.

concerted, declare that they know that something has happened but that they do not know what. A small minority recognize the fact that an electrical current has passed through the hand.

An improvised cardboard screen—temporarily pushed aside in the illustration—stands behind the base of the "guillotine" to prevent inspection of the mechanism by the prospective subject.

Concealed from the view of the subject by a rafter in the ceiling is a large bell. This bell, like the hand board, is operated by batteries and controlled by a telegraph key. It possesses a loud piercing tone calculated to startle even the deaf.

Placed in a convenient position beneath the near edge of the recording table is a button which operates a small signal light.

All of the above-mentioned circuits: magnetizing coil, hand board, bell and light—are neatly led off into a small adjoining room (see Fig. 4, pg. 23) where the three control switches and the signal light are conveniently installed in juxtaposition.

Fig. 2, below, is a diagram of the electrical connections employed in the operation of the guillotine (this being the name by which we have come to call the apparatus).

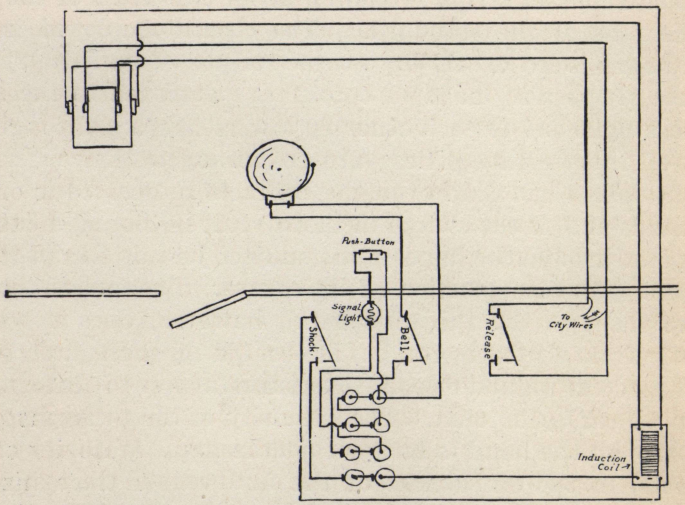


Fig. 2.

Let outer guillotine contacts represent supply to shock circuit; and inner to magnetizing coil.

All wires shown passing from one room to the other actually pass through the wall at one point, as a single cable.

The recording device, shown in both Figs. 1 and 4 on pages 15 and 23 respectively, employs no materials other than those in common use in physiological laboratories and requires no extended description here.

Both the arm band and the chest band—the obvious purpose of which is to record the subject's muscular and respiratory movements—are made out of ordinary sphygmomanometer sleeves, the band of which is placed around the arm, being used just as it is purchased on the market. The chest band, however, which is here used as a pneumograph, is adapted to that purpose by having an ordinary buckle and strap sewed to its ends. It may thus be snugly adjusted around the chest of any subject, slender or otherwise. Both of these sleeves lead off to air tambours which, in turn, write upon a smoked paper drum which is set to revolve once in twenty seconds. The lower needle is connected with the arm sleeve; the upper gives the pneumograph tracing.[1]

Though in no wise essential to an understanding of the guillotine as it stands, it may perhaps be of some interest to draw a comparison between the guillotine in its final form as described above and the original guillotine as it was delivered to the laboratory by the manufacturer. At that time the weight was suspended on a rope which was slung over a pulley, the latter being in the position now occupied by the magnetic suspending device, and there was no "hand block" between the bottom of the standards. This means that the weight at first stopped about a foot above the subject's hand instead of directly above it as in the improved guillotine.

The changes which were finally made were decided upon as the result of a series of rather gross preliminary tests of which no permanent records were taken. The subjects in these early tests were the members of the fraternity in whose house the writer was domiciled during the academic year in which this experiment was begun. The results of these first tests were a great disappointment,—and threatened to undermine all confidence in the adequacy of the apparatus to accomplish the purpose for which it had been constructed. With very few exceptions these first subjects appeared to regard the test with sang-froid, exhibiting little, if any, concern when the weight was dropped. The unanimity of the comments of these sub-

[1]Later in the course of the experiment a regular Stoelting pneumograph was used.

jects, however, clearly indicated what changes were needed in order to accomplish our purpose. The most obvious fault appeared to be the fact that the weight came to a standstill altogether too far above the hand. A more serious objection however, concerned the manner of operation, namely, by releasing the pulley rope by hand in full sight of the subject. Seeing the rope, the subjects asserted, immediately suggested to them the idea that the weight was at all times directly under the control of the operator,—and thus greatly minimized the difficulty of the test.

Reference to the description of the guillotine in its final form, as given above, will reveal the manner in which these difficulties were overcome. A statement of the raison d'être of the induction coil shock still remains, however, to be given.

While working with the apparatus for the purpose of determining empirically the optimum height for the hand block which it had been decided to install, numerous trials were made with piles of books placed between the standards. In one instance the pile proved to be a fraction of an inch too high and the result was a stinging blow on the back of the hand. The effect of this experience was peculiar. In spite of a detailed knowledge of the cause of the mishap and of the construction of the instrument as a whole, it had become necessary for the writer to exercise a very considerable degree of self-control in order again to place his hand between the standards of his own apparatus.

Following upon this experience the writer became very anxious to devise some means of creating an illusion on the part of the subject that the weight had hit him, hoping thus to greatly increase the difficulty of the test. Every effort was made to improvise some method of "hurting the subject without hurting him." The induction coil shock board described above was the outgrowth of this effort; and, while it did not regularly create the desired illusion, it may safely be said that it did operate in no small degree to make the test a more difficult one and therefore better calculated to bring out fine differences in individual responses.

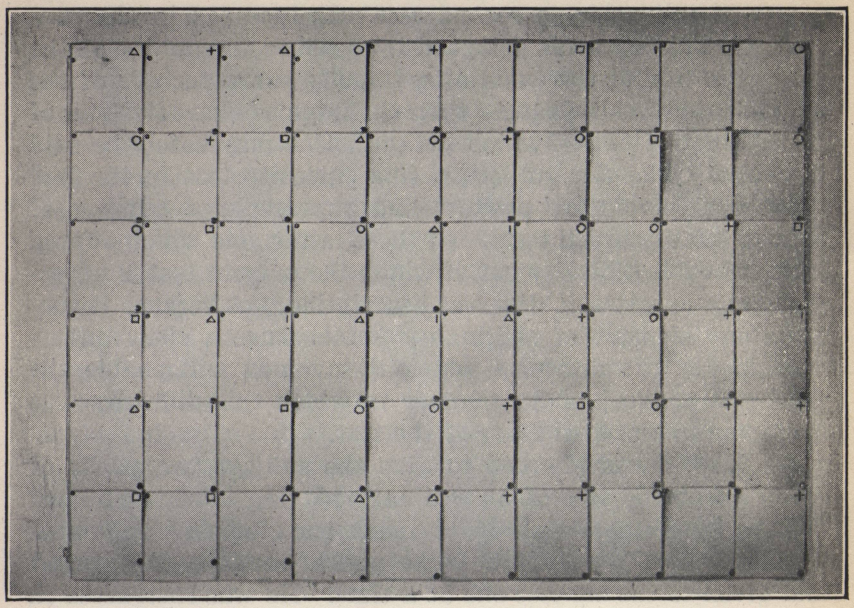
* * * *

In compliance with a suggestion made by the Department of Psychology of Columbia University, under whose direction this experiment was carried on, to the effect that no one test alone could be relied upon as a measure of an individual's

power of inhibition, a second test was included in the procedure. This test was designed to measure the ability of the subject to inhibit the examining impulse characteristic of the instinct of curiosity, rather than the impulse characteristic of the instinct of fear,—which the guillotine may safely be said to evoke. Like the guillotine, this curiosity test in its final form is an evolution product and supersedes a number of similar but discarded tests. Of these latter, one which offered a considerable difficulty but of which the present test is nevertheless an outgrowth, deserves description, not because it contains any element of originality but because a clear understanding of the difficulty which it involved will enable the reader to appreciate the manner in which this difficulty was overcome by the final form of the test.

At first it was planned to give the subject two packs of cards about the size of an ordinary playing card, each card bearing in its upper right hand corner one of the five following symbols: ○, □, △, +, I. The packs were roughly mixed and given to the subject one at a time. He was instructed in each case to sort the cards into piles corresponding to the symbols as rapidly as possible without making any errors. Time was taken with a stop-watch. The cards in the first pack were absolutely plain except for the above-mentioned symbols. The cards in the second pack however, besides bearing a symbol in their upper right hand corners, were decorated with various forms of distracting pictures gathered from magazine advertisements. Strange as it may seem, however, the regular outcome of this experiment was that the subject sorted the pictured set fully as rapidly as the plain set! The explanation for this unexpected result lay in the fact that, even when the subject was sorting the cards with all the speed that his hands could develop, there still remained plenty of time for him to see enough of the pictures en passant to satisfy his curiosity, i.e., the maximum speed obtainable for the sorting still left plenty of time for the examination of the distracting devices. Clearly a test of this character employing pictures on cards as a distracting device, could succeed only if it were possible for the subject, throughout the entire experiment, to do whatever was expected of him as rapidly as his *mind*—and not his hands—would permit.

Figs. 3 and 4 will immediately reveal to the reader the change which was made in our test. Clearly, by tacking all



A

B

Fig. 3.

the cards of both series right up against a plain wall, and covering them with a black cloth which can be quickly drawn when counting is to begin, we have overcome our difficulty. Any difference between the subject's performance on the plain series and on the pictured series would now appear to be logically attributable to the presence of the pictures in the second series.

Again, however, trials with the test in this form brought forth a disqualifying revelation: The practice effect gained by the subject during the counting of the symbols in the plain series was in all cases sufficient to overcome the distraction offered by the pictures in the second series.

To overcome this new difficulty, a small "demonstration board" was made up. This demonstration board—which may be seen in Fig. 4, balanced upon the radiator—is a miniature duplicate of the plain series as given in the test proper, being identical therewith in all respects except size and the symbol pattern.

As this curiosity inhibition test was finally standardized, the subject was required to count the symbols on the demonstration board time after time until the stop-watch should

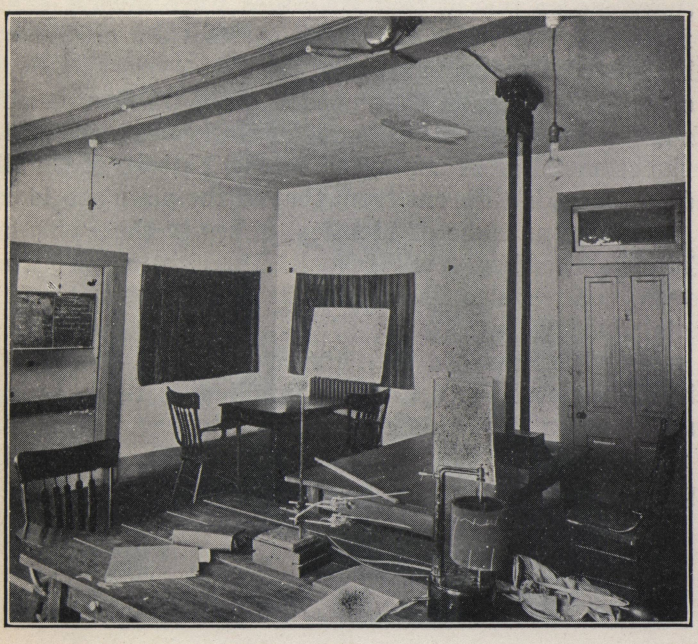


Fig. 4.

indicate the appearance of the first plateau in his practice curve. Then and then only was the "test proper" given; and it would appear that it may safely be said that, in this final form, the procedude of the test is free from any technical difficulties.

Examination of Fig. 4 shows the two black curtains covering the two series of cards, and also a table standing between the cards and the chairs in which the subject is seated during the test. The curtains, which may be drawn aside with one quick movement, hide from the subject the true nature of the test until the proper moment. Their use also makes it possible for the experimenter to standardize his procedure so that he may start his stop-watch at a moment which shall be "psychologically equivalent," and so entirely just to all subjects. Every person taking the test is instructed to "Start to count just as soon as the curtain is drawn," and the experimenter regularly starts his stop-watch at the same instant that he, with his other hand, quickly draws aside the curtain. The purpose of placing a table between the subject and the cards was to prevent one subject from sitting five feet from the cards while another sat three feet away and still others at different distances, thus entirely invalidating the test. The table was therefore so placed that its edges were always exactly four feet from the walls and the subjects were always comfortably seated directly in front of the table.

Great care was taken that no detail should be overlooked which might intervene to make one of the series more difficult than the other. For example, the symbol pattern of the illustrated set, though different from that of the plain set, is carefully graded so as to be of identical difficulty therewith, as a careful perusal of Fig. 3 will reveal. The lighting also was so arranged as always to illuminate the two series with almost absolute equality.

In giving the Stanford Revision of the Binet-Simon Scale, which was adopted for use in the intelligence testing carried on in connection with this experiment, the regulation blanks and materials provided therefor by the Houghton Mifflin Company were employed.

CHAPTER III

THE PROCEDURE

In this experiment, as in all psychological work, a rigorously standardized procedure is absolutely essential. Our procedure, as outlined below, was standardized during the period of preliminary testing to which we have already referred. These early volunteers afforded us the opportunity of detecting and correcting any flaws and irregularities in the manner of conducting the experiment, thus making it possible for us to embark upon the testing of our two hundred subjects with an already thoroughly standardized procedure which later fortunately proved itself altogether satisfactory.

The following is the routine through which each of the subjects was put:

1. On entering the room his attention is first directed to a signed statement written on the board in a large, bold hand (see Fig. 1) reading, "I positively assure you upon my word that no harm whatsoever can possibly come to anyone as a result of any test given in this laboratory." In the case of an illiterate subject, this statement was read to him verbatim, the experimenter reading sufficiently slowly and clearly to insure its comprehension by all persons of adequate general intelligence.

1'. Practically every subject, upon entering the room, began immediately to question the examiner. Many of the questions were such that a truthful answer would have entirely invalidated the test. Refusal to give any answer whatsoever would, on the other hand, have provoked, from many subjects, a retaliatory refusal to proceed with the experiment at all. The only remaining possibility, that of parrying with the subject in an effort to create a maximum willingness to co-operate with a minimum divulgence of information, was open to the very serious objection that it injected an element of irregularity into the procedure which might very well render the performances of two individuals in the test entirely incomparable. The procedure actually adopted appeared to be the only possible solution of the difficulty which was at once practicable and scientifically permissible. It automatically eliminated all conversation on the topic and lent itself most readily to absolute standardization. It is unfortunate that it was necessary to make such a sweeping assertion, thereby, of course, materially reducing the difficulty of the test; but it is believed that the difficulties and irregularities which it obviates renders its use very decidedly the lesser of two evils.

2. Immediately the subject has finished reading the statement, he is seated directly in front of the guillotine, *the weight, at the time, being permitted to rest directly upon the hand-block.* (In describing the plungers employed to arrest the falling weight, it was omitted to mention that they may easily be lifted in and out of the cylindrical openings in which they are set, thus making it possible to manouver the weight as here described.) For about one minute, during which the experimenter busies himself preparing his fountain pen and stop-watch for the next step in the procedure, the subject is permitted to sit idly before the apparatus drinking in, as it were, its somewhat ominous and mysterious possibilities.

2'. The purpose of this step is to imprint upon the mind of the subject a visual image of the weight resting directly upon the hand-board, an image which will almost certainly recur to him later when he is told that "Something is going to happen" and that, no matter what happens, he is to hold his hand absolutely still. Obviously, this must lead him to the conclusion that, if the weight falls at all, it will probably fall all the way. This can scarcely fail to increase the difficulty of the test, thus, in some measure, counteracting the influence of Step 1.

3. The minute over, the subject's attention is turned to the demonstration board. Here, the symbols, already described, are pointed out to him and he is asked to give a name to each. Whatever names he employs are unhesitatingly accepted and he is encouraged to continue to use his own terminology. Wherever a subject appears to be entirely unable to recall any name for one or more of the symbols, the deficiency is made good for him by the experimenter. This much accomplished, the following formula is spoken to the subject: "YOU ARE TO COUNT THE NUMBER OF EACH KIND OF SYMBOL IN EACH VERTICAL COLUMN. FOR INSTANCE, IN THIS COLUMN—pointing to the fifth—YOU WOULD SAY, 'TWO CROSSES, TWO SQUARES, ONE CIRCLE AND ONE TRIANGLE' (or 'TWO Xs, TWO BOXES, ONE O AND ONE V' or whatever other terms the subject has chanced to employ). YOU ARE TO PAY NO ATTENTION TO THE THREAD THAT THE CARDS ARE SEWED ON WITH—(pointing to it). START AT THE LEFT HAND COLUMN AND GO AS FAST AS YOU CAN WITHOUT MAKING ANY MISTAKES. GO!" The experimenter, using a previously prepared key, holds the subject to a perfect score by saying "AND WHAT ELSE?" or "HOW MANY CROSSES?" or whatever the case calls for, whenever any omission or error is made.

The total time is recorded with a stop watch. The same performance is then gone through all over again. This time, however, the instructions are to commence with the extreme right hand column and count back to the first. This process is kept up—alternating the direction every time—until the time record indicates that the initial drop has given way to the first plateau,—the number of repetitions necessary with different subjects varying from three to eight. After the third or fourth trial, a moment's rest is regularly allowed.

During the progress of the above symbol counting, the experimenter or his assistant prepares the guillotine for use by raising the weight and catching it on the suspending device, after which the plungers are securely set into position. These last steps are quietly performed while the subject is busily engaged counting against time, and every possible precaution taken against turning his attention from the cards to the preparatory activities of the experimenter,—with the result that, throughout the entire course of the experiment, the writer was never "caught in the act" of inserting the plungers.

4. The subject is now again seated before the guillotine and the arm band and chest band are buckled into place and connected with the tambours, the writing levers of which are, in turn, adjusted to write upon the kymograph drum for which a smoked paper has been previously prepared. (See Fig. 1.) When everything is in position, the subject is instructed to place his left hand between the standards. His attention is now called to the fact that we are able to record with mechanical accuracy the slightest movement of either his left arm or his chest. The following formula is then spoken to him in a straight-forward matter-of-fact manner: "THIS IS A TEST OF SELF-CONTROL. *SOMETHING* IS GOING TO HAPPEN; BUT NO MATTER WHAT HAPPENS YOU ARE TO HOLD YOUR HAND ABSOLUTELY STILL. DO YOU UNDERSTAND?" The experimenter then pauses a moment to give the subject an opportunity to compose himself and then continues: "IS YOUR MIND THOROUGHLY MADE UP THAT NO MATTER WHAT HAPPENS YOU WILL NOT PULL YOUR HAND AWAY?" As soon as assent is given, and the subject appears to be well poised, the experimenter starts the kymograph drum and, by means of a signal light, notifies the assistant in the adjoining room to operate the machine. Immediately, *the weight drops, the gong rings*

and, just as the weight strikes the plungers, a small charge of electricity passes through the hand-board which, if the subject's hand be still on the board, is felt as a slight shock. The kymograph drum is now brought to a standstill.

The weight is now raised and again caught upon the suspending device. A moment is devoted to interpreting to the subject the kymographic evidences of his reaction; and then the test is gone through with again. In the later tests, however, this difference in procedure is to be noted: The subject is never permitted to feel the shock more than once,—i.e., immediately after that trial in which he for the first time successfully maintains his hand in position upon the block the shock is discontinued and all subsequent tests upon this subject are made with the bell as the sole distracting factor. Repetitions of the test are now continued until the operation of the instrument produces in the subject no recordable reaction whatsoever, either muscular or respiratory. The subject is then released from the recording impedimenta,—the while an assistant removes the kymograph drum to an outer room where the graph is carefully shellaced and filed. This completes the giving of the volition test.

4'. Why is the subject instructed to place his *left* hand upon the block? Assuming that the fact that most of us possess a lesser degree of control over our left hands than we do over our right is not an indication that the neural connection between the left arm and the right pyramidal cortex is any less intimate and direct than that which exists between the right arm and the left pyramidal cortex, but is merely a resultant of our more frequent and habitual use of the right arm—thus, of course, causing the synapses in the tracts leading to the muscles of the right arm to offer less resistance to the passage of impulses than do the corresponding synapses of the left side,—assuming this to be the essential reason for our comparatively lesser degree of control over our left hands, it is obvious that by requesting the subject to place his left, rather than his right hand upon the hand-board, we are again succeeding in making our test more difficult—and so, of course, more readily susceptible of scoring—without in any degree altering its strictly psychological, as opposed to physiological, i.e., cerebral as opposed to spinal, nature.

5. The Inhibition of Curiosity Test, preparation for which has already been made (see step 3 above), follows: The subject is comfortably seated directly before the curtains covering the plain series of cards and the following instructions are spoken to him: "UNDER THIS CURTAIN YOU WILL FIND SIXTY PIECES OF CARDBOARD JUST AS YOU FOUND OVER THERE,—pointing to the demonstration board. IN THE UPPER RIGHT HAND CORNER OF EACH CARD,

YOU WILL AGAIN FIND A SYMBOL, JUST AS YOU DID BEFORE, AND YOU ARE TO DO EXACTLY THE SAME THING AS YOU DID BEFORE, THAT IS,—COUNT THE NUMBER OF EACH KIND OF SYMBOL IN EACH COLUMN AS QUICKLY AS YOU CAN WITHOUT MAKING ANY MISTAKES. DO YOU UNDERSTAND? START TO COUNT JUST AS SOON AS THE CURTAIN IS DRAWN ASIDE—READY!" The experimenter then draws the curtain aside with one quick movement at the same moment that he, with his other hand, starts his stop watch. As in the demonstration series, the subject is held to a perfect score by interrogatory interruptions whenever an error or omission is made. As soon as the subject has correctly completed the counting of the series, the stop-watch is stopped and the total time for the performance is recorded.

6. The technique of this step differs but little from that of step 5. This time the subject is seated before the curtain covering the *pictured* series and the following directions are given: "UNDER THIS CURTAIN YOU WILL AGAIN FIND SIXTY PIECES OF CARDBOARD AND IN THE UPPER RIGHT HAND CORNER OF EACH OF THEM YOU WILL AGAIN FIND A SYMBOL. ONCE MORE YOU ARE TO COUNT THEM JUST AS YOU DID BEFORE. DO YOU UNDERSTAND? LET NOTHING DISTURB YOU AND START TO COUNT JUST AS SOON AS THE CURTAIN IS DRAWN." As in step 5, the subject is again held to absolute correctness and his total time recorded with the stop-watch.

The routine of the entire experiment is now practically over and the tension of the procedure is materially relaxed while the following final steps are run through.

7. After chatting informally with the subject for a moment, the experimenter proceeds to obtain his introspections, employing the questionnaire which appears upon the following page.

7'. While working with the preliminary group of subjects, an attempt was made to obtain an introspectional account without prodding the subject with any specific questions. With the exception of such few persons as had received some training in psychology, however, this method proved altogether futile, making the adoption of some questionnaire such as we employed absolutely essential.

REPLICA OF INTROSPECTION QUESTIONNAIRE

Name: ..... Date: ..... Subject No.: .....

Attitude toward experiment as a whole: .....

Entering attitude: .....

Frightened: .....

Did you think the weight hit you the first time?—the second time? .....

Did the statement on the wall come to your mind at any time during the progress of the tests? .....

Did you have any idea what was going to happen? .....

Did you feel a real desire to pull your hand away? .....

Did you feel that you had to exercise self-control in order not to pull your hand away or move your arm? .....

How did the bell affect you? .....

Additional voluntary introspective report: .....

* * * *

Was the retardation physiological or psychological? .....

Additional voluntary introspective report: .....

8. An I. Q. determination is made, employing Terman's Stanford Revision of the Binet Simon Scale.

8′. Owing to the pressure of time, the subject having now already been in the laboratory some forty minutes, the short scale, i.e., starred tests only, was used almost exclusively.

9. Finally, each subject is given a printed slip bearing the following pledge: "I hereby give my word that I will not tell anyone about the tests which I have just undergone except the fact that I have not been hurt in any way." His signature to the above obtained, he is dismissed from the laboratory and the experimenter is ready to proceed with the next subject.

9′. The effectiveness of this pledge in actual use proved to be much greater than one would at first have been led to expect. Almost without exception, the departing subjects—both white and colored—appreciated that foreknowledge of the nature of the test would entirely destroy any value which it might have. But more than that, they seemed to feel that, in going through the test, they had accomplished a considerable feat, and they were most certainly not disposed to make the test any easier for those to follow by telling them about it. It might be said that they entered into a playful conspiracy with the writer "against" their friends and relatives who were yet to undergo the test. This particular aspect of the experiment was indeed a source of considerable merriment among the darkies some of whom would sneak upstairs and sit breathlessly in the utter darkness outside the laboratory door while some friend was being put through the paces within. . . The examination over, subject and friend might be heard laughing and slapping each other on the back in childish glee as they disappeared over the ridge into "darktown." It was this reaction primarily—manifested alike by whites and blacks, though admittedly more markedly by the blacks—and the pledge secondarily which was relied upon to prevent ex-subjects from disclosing the details of the test; and it is the writer's opinion that the method proved itself surprisingly effective.

One variation from this procedure was regularly allowed whenever it appeared convenient, namely, the giving of the intelligence test (Step 8, above) was made the first step in the procedure instead of the next to the last, all other steps being carried out as before. This variation made it possible to examine two subjects simultaneously, an assistant giving the Stanford examination to one subject, while the writer and a second assistant put the other subject through the laboratory tests. Thus by exchanging subjects mid-way through the procedure, it was possible to complete two examinations in the time ordinarily required for one. The greatest asset of this arrangement, however, lay not in its economy of time—convenient as this was—but rather in the fact that it made it possible to say to prespective colored subjects that two of them might come to the laboratory together! Anyone who has ever had occasion to become acquainted with the negro will at once appreciate the tremendous strategic value of such a comment. It is indeed questionable whether we should ever have been able to persuade one hundred negroes to submit themselves to examination had it not been possible to take them in pairs.

The total time required to complete the procedure as outlined, varied from forty-five minutes to an hour and a half, depending, of course, upon the responsiveness of the individual subject.

CHAPTER IV

THE SUBJECTS

As has already been set forth in the preface to this paper, the experiment was tried upon 200 subjects, 100 whites and 100 negroes,—50 men and 50 women in each case. In selecting subjects for our experiment, we were careful not to choose them exclusively from any one social group—but rather to select 100 individuals from each race who should fairly well represent a cross section of that race. In short, our subjects were to be "folks" in the most inclusive sense of the word. Such an ideal group is clearly exceedingly difficult to obtain. How closely we approximated thereto may to some extent be judged from the following table showing the distribution of our subjects among the vocations:

TABLE I

SUBJECTS CLASSIFIED AS TO OCCUPATION

White Men	*White Women*
2 Physicians	5 H. S. Teachers
2 Merchants	12 College Students
1 Advertising Agent	1 Church Executive
1 Industrial Publicity Agent	4 Social Service Workers
1 Insurance Expert	1 Librarian
1 Architect	8 Nurses in Training
1 Electrical Engineer	1 Occupational Therapy Worker
6 Medical Students	1 Clinic Manager
2 College Students	2 Commercial Artists
3 Teachers	1 Laboratory Technician
1 Laboratory Assistant	1 Music Teacher
1 Printer	3 Housewives
2 P. O. Clerks	3 Stenographers
1 Office Clerk	1 Seamstress
3 Salesmen	1 Clerk
1 Parole Officer	1 Switchboard Operator
4 Mechanics and Machinist	4 Scrubwomen
1 R. R. Trainman	
1 Electrician	
1 Court Attendant	
1 Wireless Operator	
1 Chandelier Plater	
2 Hospital Attendants	
1 Window Washer	
1 Barber	
2 Chauffeurs	
2 Janitors	
1 Rigger	
1 Cook	
1 Teamster	
1 Hod Carrier	

TABLE I, *continued*

Colored Men

1 High School Principal
1 Real Estate Agent
1 Auto Mechanic
1 Shoemaker
1 Gob Sailor
1 Taxi Driver
1 Chauffeur
1 Cook
1 Theatre Usher
2 Waiters
4 Truck Drivers
1 Janitor
1 Hospital Orderly
1 Tailor's Helper
3 R. R. Track Men
1 Ice Man
2 Factory Workers
1 Ice Plant Worker
5 Farm Hands
2 General Unskilled Labor
4 In School
1 "Retired"
13 Unclassifiable "Odd Job Men"

Colored Women

4 School Teachers
11 In Own Homes
  3 Devoting entire time to housework
  2 Do incidental washing
  6 Entire time to washing and ironing for profit
5 Employed outside the Home, as follows:
  1 Dressmaker
  1 Dept. Store Stock Girl
  1 Clerk
  1 Hotel Chamber Maid
  1 Scrubwoman
15 Domestic Service in other People's Homes
  5 Cooks
  5 General Houseworkers
  4 Nursemaids
  1 Farm Kitchen Helper
1 In School
14 Not regularly employed or occupied

Fig. 5.

Fig. 5 represents the kitchen and dining room help of the institution in which the first half of this work was done. This group portrays very well the type found in the middle half of the occupational distribution given above for colored men, about half of the men in the picture having been subjects in the test. Unfortunately, no photographic record of the more picturesque characters occurring at the extremes of the group is in our possession.

A glance at the above table will immediately make it clear that our choice of subjects was not restricted to any one social or financial group, but included in a broad way, a few persons from every walk of life.

Further evidence that our subjects are representative of their respective racial groups is offered by Table X, on page 59 of the next chapter, showing the distribution of the subjects according to intelligence. Considering the small number of subjects tested, these distributions show a considerable degree of similarity to those obtained in the psychological survey of the United States draft army.

CHAPTER V

THE DATA

In presenting the data, we shall adopt the following order: First will be presented the tables derived from the figures obtained at the guillotine; second, the tables derived from the figures obtained in the giving of the inhibition of curiosity test,—and thirdly will appear the distribution tables based upon the figures obtained in the intelligence test. This will complete SERIES I of the tables.

SERIES II will present the inter-relationships existing between the factors analyzed in the first series, and will follow the same order as that obtaining in SERIES I.

SERIES III will consist of subsidiary data not bearing directly upon the problem in hand. It will present incidental material collected during the progress of the test which was of such interest to the experimenter and so readily obtainable as to make it suggest its own tabulation as a matter of course. These tables concern only the negro and bear upon the question of the relations between his I. Q. and (1) The exact shade of his blackness and (2) The opinion held by the community as to his intelligence.

Finally follows an abstract of the responses given by the subjects in answer to the questions on the introspection sheet.

It is obvious that in presenting the results of this study, our subjects may be arranged in nine groups, as follows:

Group A, the entire 200 cases.
Group B, all whites, 100 cases, 50 men and 50 women.
Group C, all blacks, 100 cases, 50 men and 50 women.
Group D, all men, 100 cases, 50 white and 50 black.
Group E, all women, 100 cases, 50 white and 50 black.
Group F, white men, 50 cases.
Group G, white women, 50 cases.
Group H, black men, 50 cases.
Group I, black women, 50 cases.

Such a grouping of the cases may prove of assistance in bringing out sex and race differences with respect to the traits being examined into,—and in all of the more important tables of distribution, this ninefold manner of presenting the data is adhered to.

SERIES I

TABLE II

NUMBER OF WITHDRAWALS

Expressed in Percentage of Cases of Each Group Giving any Specified Number of Withdrawals

	0	.5	1	.5	1.5	2	3	∞*
Group A: Entire 200	68	11.5	16.5	.5	1.5	1	.5	.5
Group B: 100 whites	72	13	12	1	1	1		
Group C: 100 blacks	64	10	21		2	1	1	1
Group D: 100 men	66	14	16		2	1		1
Group E: 100 women	70	9	17	1	1	1	1	
Group F: 50 white men	72	18	10					
Group G: 50 whitewomen	72	8	14	2	2	2	2	
Group H: 50 black men	60	10	22		4	2		2
Group I: 50 black women	68	10	20				2	

Interpretation of Table II: Of the entire group of cases, 68% (i. e. 136 subjects) gave no withdrawal, 11.5 gave .5 withdrawals. (For the exact meaning of ".5 withdrawals" see Insert IV and the note thereunder on page .) In group B, 72% of the subjects gave no withdrawal, etc. It should be noted that in groups B, C, D and E—all of which contain 100 cases—per cent coincides with the exact number of cases.

*The inclusion of the infinity symbol, ∞, in these tables was made necessary by the performance of subject #130 (See Insert XIX) who after going through two trials (and giving two full withdrawals) *absolutely* refused to continue as a subject. It did not seem permissible to throw this record out altogether,—insomuch as it was a bona fide reaction; and so it was retained. The question of scoring this performance offered unusual difficulty. It was obvious that this record, though containing only two withdrawals, was not as good a performance as that of a subject who, after giving two withdrawals, proceeded with the test and saw it through to a successful trial. On the other hand, any *estimate* of the number of withdrawals, arm and breathing movements he *would* have made if he had gone on with the test,—is equally invalid. It remained only to employ some symbol to represent his performance, and to treat it separately,—as the best way out of a bad statistical situation. One symbol being as good as another, the symbol ∞ was chosen to represent this case—and, as here employed, signifies nothing more nor less than hereinabove indicated.

Average white score = .23
Average black score = .37

TABLE III

NUMBER OF TRIAL AT WHICH ARM FIRST REMAINS QUIET

Expressed in Percentages

	1	2	3	4	5	6	7	8	9	10	11	∞
Group A: Entire 200	18	40.5	26.5	8	2.5	.5	1.5	.5	.5	.5	.5	.5
Group B: 100 whites	15	38	27	7	5	1	3	1	1	1	1	
Group C: 100 blacks	21	43	26	9								1
Group D: 100 men	16	42	29	6	3		1		1	1		1
Group E: 100 women	20	39	24	10	2	1	2	1			1	
Group F: 50 white men	16	34	30	8	6		2		2	2		
Group G: 50 white women	14	42	24	6	4	2	4	2			2	
Group H: 50 black men	16	50	28	4								2
Group I: 50 black women	26	36	24	14								

Interpretation of Table III: 18% of the entire group maintained the arm quiet the very first time, 40.5% of the entire group first maintained the arm quiet on the second drop of the weight, etc.

Average white score = 2.90
Average black score = 2.24

TABLE IV

NUMBER OF TRIAL AT WHICH BREATHING FIRST REMAINS QUIET

Expressed in Percentages

	1	2	3	4	5	6	7	8	9	10	12	28	∞
Group A: Entire 200	16	29	28	14	.5	4	3	.5	2	1	.5	.5	.5	.5
Group B: 100 whites	6	19	36	18		6	5	1	4	2	1	1	1	
Group C: 100 blacks	26	39	20	11		2	1							1
Group D: 100 men	13	30	30	16		3	2		2	1	1		1	1
Group E: 100 women	19	28	26	13		5	4	1	2	1		1		
Group F: 50 white men	6	10	40	26		4	4		4	2	2		2	
Group G: 50 white women	6	28	32	10		8	6	2	4	2		2		
Group H: 50 black men	20	50	20	6		2								2
Group I: 50 black women	32	28	20	16		2	2							

Table IV is read just as was Table III.

Average white score = 3.91
Average black score = 2.27

An examination of the inserts appearing on the next following pages will illustrate to the reader the manner in which the various types of performance were recorded by the kymograph; and will also greatly facilitate the comprehension of the tables already presented.

It will be observed that our experimental procedure measured not only the number of withdrawals given by each subject, but also the number of muscular and respiratory flinches made by him before he achieved absolutely perfect control. It may also be noted from an inspection of the laboratory graphs inserted below that these separate functions are relatively independent of each other, i.e., a subject who gives no withdrawal may nevertheless require 8 or 10 trials before passing the test, whereas another subject, one giving a much greater reaction at first .5, 1, 1.5, or even 2 actual withdrawals—may pass the test on the second or third trial. Likewise, with reference to the muscular and respiratory flinches,—a successful control over one may be obtained before the other is mastered and vice versa—or, indeed, both may be brought under control at the same trial.

Turning these considerations over, it became evident that the fullest measure of an individual's reaction to the guillotine situation could only be obtained by employing some one figure which should measure both the number of arm movements and the number of breathing movements considered together. Accordingly, the figure representing the number of the trial at which the arm is first quiet was multiplied by the figure indi-

cating the number of the trial at which the breathing was first quiet and the resulting figure was termed the FLINCH PRODUCT. Thus, an individual whose arm score was 3, (i.e., whose arm moved or withdrew the first and second times but was quiet the third) and whose breathing score was 4 would receive an F. P. rating of 12,—as would also individuals possessing scores of arm, 4—breathing, 3, or arm, 2—breathing, 6, etc.

Table V represents the distribution of subjects on the basis of Flinch Product. In the construction of Table V ease of comprehension has been sacrificed in favor of completeness. While difficult to read, Table V has the advantage of bringing together in two distributions (one for each race) *all* of the measurable facts obtained from the guillotine experiment. Thus, should any reader be interested to work out interrelationships which have not been considered in this presentation, Table V will furnish the material for the tabulation of the desired subsidiary distributions.

TABLE V—*(a)

SHOWING DISTRIBUTION OF SUBJECTS ON BASIS OF ALL THREE FACTORS OF THE GUILLOTINE PERFORMANCE—WITHDRAWALS, ARM AND BREATHING SCORES

[Figure in Upper Right Corner of Space Indicates Men (Group F); in Lower Right, Women (Group G)]

WITHDRAWALS	F.P.	1	2	3	4	5	6	8	9	10	12	15	16	18	20	24	25	27	30	35	56	72	100	132	252	∞
	ARM & BREATHING	1,1	2,1	1,2	1,3	2,2	1,4	1,5	3,2	2,3	4,2	2,4	3,3	2,5	4,3	3,4	2,6	5,3	3,5	4,4	2,8	6,3	3,6	5,4	4,5	4,6	5,5	3,9	5,6	5,7	7,8	8,9	10,10	11,12	9,28	CASE NO 130
	0	2 3 1	1 3 2	1 4 3	4 6 2	3 9 6	1 1 0	0 1 1	0 1 1	5 10 5		3 4 1	8 11 3	0 1 1	0 1 1	1 3 2	0 1 1	0 1 1	0 1 1	2 2 0	1 1 0	0 1 1	0 1 1			0 1 1	1 1 0		1 1 0		1 2 1		1 1 0			
	.5				1 3 2			2 3 1								3 3 0								1 1 0	1 1 0		1 1 0					0 1 1		
	1				0 2 2							1 1 0	1 1 0		0 1 1	1 3 2			0 1 1					1 1 0						0 1 1			1 1 0	
	.5 .5												0 1 1																					
	1.5																													0 1 1				
	2																															0 1 1		
	3																																	
	∞																																	
	TOTAL	2 3 1	1 3 2	1 4 3	4 6 2	4 14 10	1 1 0	0 1 1	0 1 1	7 13 6		4 5 1	9 13 4	0 1 1	0 2 2	5 9 4	0 1 1	0 1 1	0 2 2	2 2 0	1 1 0	0 1 1	0 1 1	1 1 0	1 1 0	1 2 1	1 1 0	1 1 0	1 1 0	0 1 1	1 3 2	0 1 1	1 1 0	0 1 1	1 1 0	

GROUP B—ALL WHITES

*NOTE:—TABLE V IS PRESENTED ONLY FOR GROUPS B AND C.
1. ARM FIGURE ALWAYS PRECEDES.
Average flinch product score =15.5.
Median flinch products core = 8.
Owing to the fact that F. P. score progresses by multiplication, the average is here misleading.

Interpretation of Table V(a): Of the entire group of 100 white subjects, 3 (there being 100 subjects, these figures can be thought of as representing either "cases" or "per cent") subjects who scored a Flinch Product of 1. Obviously, this could be accomplished only by maintaining both arm and breathing quiet the first time. This is indicated by the figures "1,1" in the row labelled "Arm and Breathing." Since these 3 subjects maintained their arms quiet the first time, they could not have given any withdrawals. This is indicated by the fact that this figure occurs in the row labelled "O Withdrawals." Of these three subjects, 2 were men and 1 was a woman. This is indicated by the small figures "2" and "1" in the upper and lower corners of the square respectively. Considering next the column F.P.=4, we first note that this F.P. score was made in two ways. 14 (9+3+2) persons made it by keeping both arm and breathing quiet the second time. 1 person arrived at the same score by maintaining his arm quiet the first time, but his breathing not until the fourth. Of the former group (of 14), 9 gave no withdrawal, 3 gave a .5 withdrawal and 2 gave 1 withdrawal, etc.

Table V(b) is read the same as Table V(a).

TABLE V-)b)

F.P.	1	2		3	4	5	6		8	9	10	12		15	16	18	20	24	25	27	30	35	56	72	100	132	252	∞
ARM-& SHEATHING	1,1	2,1	1,2	1,3	2,2	1,4	1,5	3,2	2,3	4,2	2,4	3,3	2,5	4,3	3,4	2,6	5,3	3,5	4,4	2,8	6,3	3,6	5,4	4,5	4,6	5,5	3,9	5,6	5,7	7,8	8,9	10,10	11,12	9,28	CASE NO 130
0	7 17 10	3 9 6	0 2 2	1 2 1	12 16 4			1 3 2	3 5 2		0 2 2	2 3 1		0 1 1	1 3 2				0 1 1										
.5					2 3 1			2 2 0	0 1 1	0 1 1		1 2 1							0 1 1										
1					5 7 2			3 5 2				2 5 3			1 1 0				0 1 1		0 1 1	0 1 1							
.5 .5																																			
1.5												1 1 0											1 1 0											
2																			1 2 1															
3																																			
∞																																		1 1 0	
TOTAL	7 17 10	3 9 6	0 2 2	1 2 1	19 26 7			6 10 4	3 6 3	0 1 1	0 2 2	6 11 5		0 1 1	2 4 2				1 5 4			0 1 1		1 2 1										1 1 0

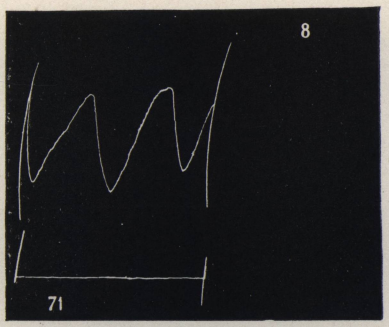
WITHDRAWALS

GROUP C—ALL BLACKS

Average flinch product score = 5.5.
Median flinch product score = 4.

The following sixteen graph inserts are so chosen as to include one or more specimens of each of the principal combinations of reactions; and a careful inspection of the series will demonstrate both the manner in which the subjects' reactions were recorded and the basic evidence from which our conclusions were drawn.

During the progress of the statistical analysis of our results, a "Flinch Product Rank Number" was assigned to each subject. This number amounts practically to an "order of merit" rank number. Although most of the results of the statistical process of which this ranking was a part were abandoned, the F.P.R. number (scratched in the upper right hand corner of each graph) is retained, as it serves to quickly give the reader an exact idea as to just where the particular subject whose graph he is reading stood with reference to the remaining hundred and ninety-nine subjects. The better a subject's performance (i.e., the less reaction given), the lower the subject's F.P.R. number, and vice versa. The graphs are presented in the order of increasing F.P.R. number, regardless of the effect of this arrangement upon the race and sex sequences.

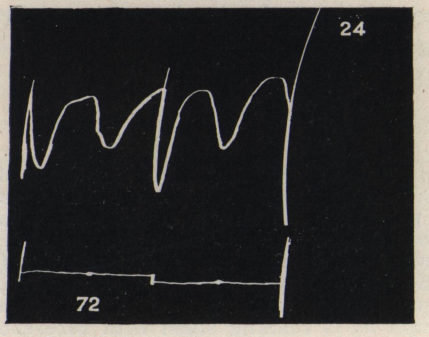


Insert I.

Subject No. 71—White Woman.

O Withdrawals, Arm quiet 1st Time. Breathing 1st. Time, Flinch Product 1 (1 x 1). Flinch Product Rank Number, 8.

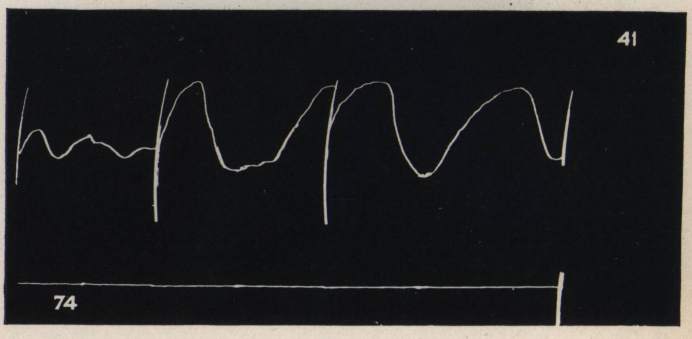
The irregular wavering of the arm line (below) is due to the vibration of the entire instrument in response to the falling of the weight. That it is not a reaction on the part of the subject is indicated by the fact that the arm line does not leave its level, nor the breathing line deviate from the pattern of the previous inspiration.



Insert II.

Subject No. 72—White Woman.

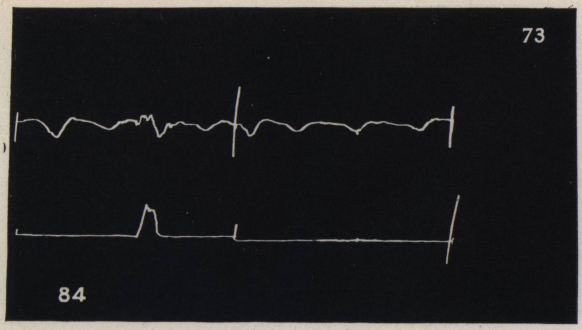
O Withdrawals, Arm quiet 1st trial, Breathing 2nd. Flinch Product, 2. F.P.R. No. 24.



Insert III.

Subject No. 74—White Woman.

O Withdrawals, Arm quiet 1st trial, Breathing 3rd. Flinch Product, 3. F.P.R. No. 41.

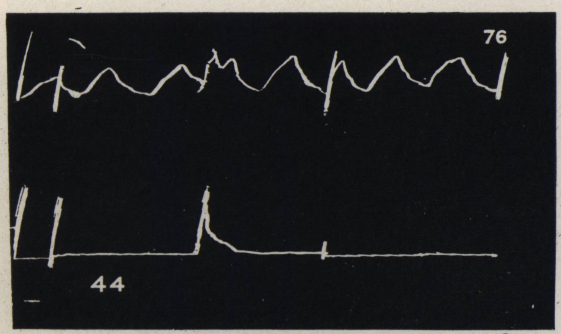


Insert IV.

Subject No. 84—White Woman.

.5 Withdrawals, Arm quiet 2nd time, Breathing 2nd time. Flinch Product 4. F.P.R. No. 73.

Note: ".5 Withdrawals" is a term employed to indicate a reaction greater than a "flinch" but not amounting to a removal of the hand from the board. ".5 Withdrawals" thus includes all those cases in which the hand described a definitely observable movement, though remaining in contact with the handboard.

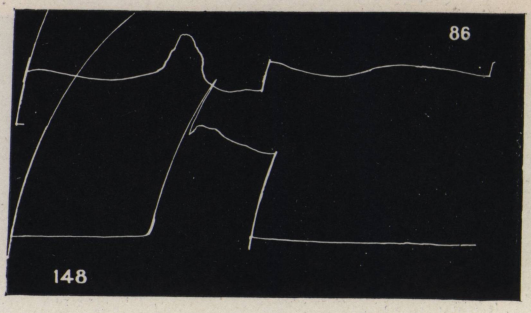


Insert V.

Subject No. 44—White Man.

.5 Withdrawals, Arm quiet 2nd trial, Breathing 2nd. Flinch Product 4. F.P.R. No. 76.

It will be noted that, although the above graph is given the same rating— .5, 2, 2.—as the previous graph (See Insert IV) its F.P.R. No. is 3 points greater than that assigned to the graph on the previous page. A comparison of the two records will make evident the grounds for their respective ratings. Although both of them must be rated as ".5, 2, 2" performances, the flinches recorded in this graph are clearly of greater amplitude than are the flinches of the previous graph.

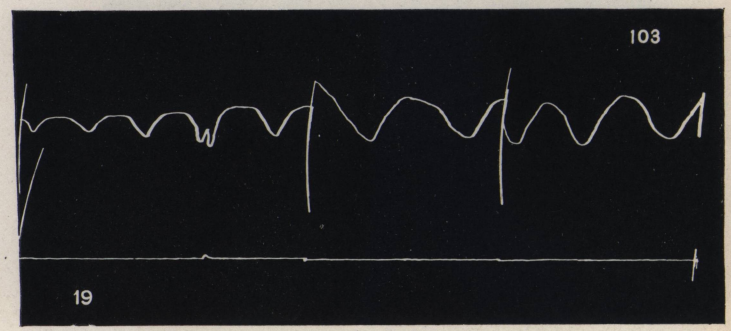


Insert VI.

Subject No. 148—Colored Man.

1 Withdrawal, Arm quiet 2nd trial, Breathing 2nd. Flinch Product 4. F.P.R. No. 86.

Again, in comparing this insert with the previous one, it will be noted that, though they both have a Flinch Product of 4, Insert VI has a Flinch Product Rank Number 10 points higher than that of Insert V. The justification for the highest rank number of Insert VI lies in the fact that this subject gave a complete withdrawal, whereas the subject of Insert V gave only a .5 Withdrawal. The irregular differences in F.P.R. No. seen in this sequence of inserts is due simply to the fact that these graphs constitute a *sampling* of the different types of performance.

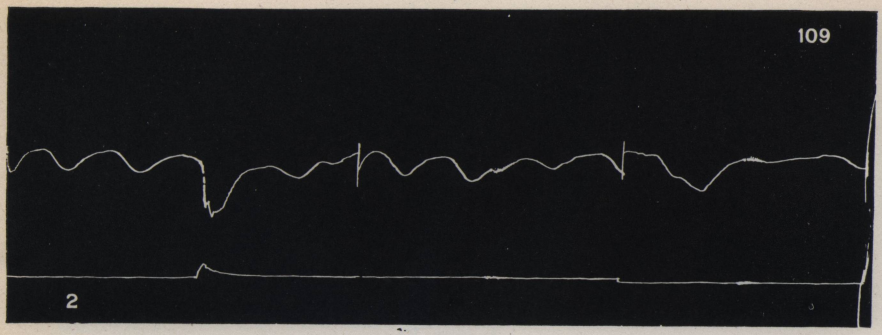


Insert VII.

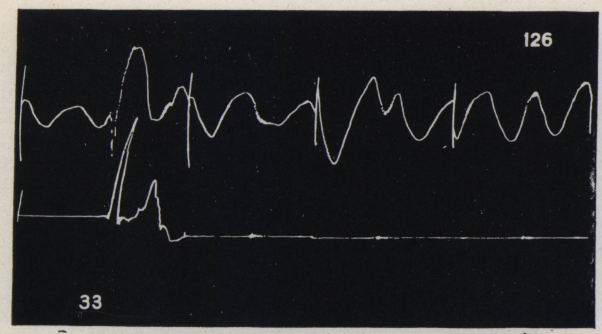
Subject No. 19—White Man.

0 Withdrawals, Arm quiet 2nd trial, Breathing 3rd. Flinch product 6. F.P.R. No. 103.

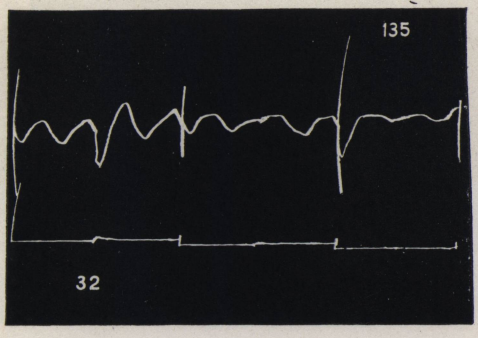
The first arm movement observed here, while an unusually definitely circumscribed flinch, was not accompanied by any visible movement of the arm on the hand-board, and consequently does not rate as a .5 Withdrawal.



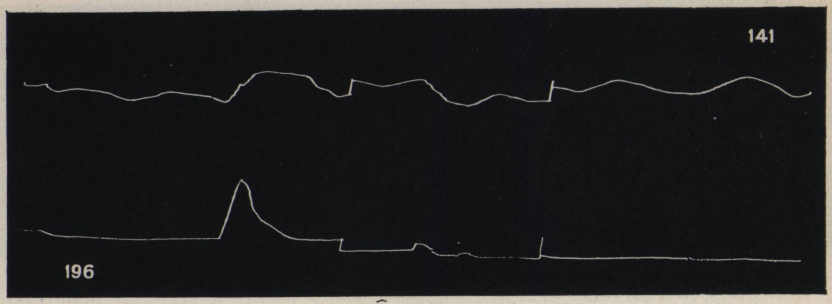
Insert VIII.
Subject No. 2—White Man.
.5 Withdrawals, Arm quiet 2nd trial, Breathing 3rd. Flinch Product 6. F.P.R. No. 109.



Insert IX.
Subject No. 33—White Man.
1 Withdrawal, Arm quiet 2nd trial, Breathing 4th. Flinch Product 8. F.P.R. No. 126.



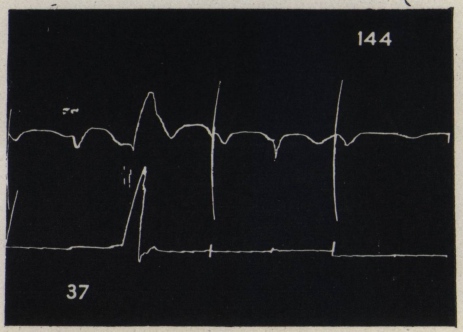
Insert X.
Subject No. 32—White Man.
0 Withdrawals, Arm quiet 3rd trial, Breathing 3rd. Flinch Product 9. F.P.R. No. 135.



Insert XI.

Subject No. 196—Colored Woman.

.5 Withdrawals, Arm quiet 3rd trial, Breathing 3rd. Flinch Product 9. F.P.R. No. 141.

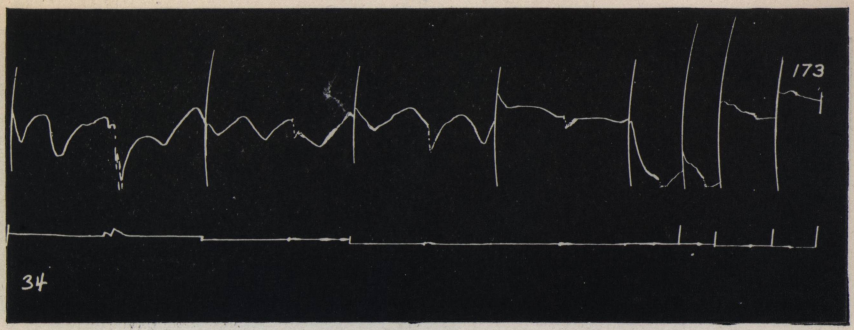


Insert XII.

Subject No. 37—White Man.

1 Withdrawal, Arm quiet 3rd trial, Breathing 3rd. Flinch Product 9. F.P.R. No. 144.

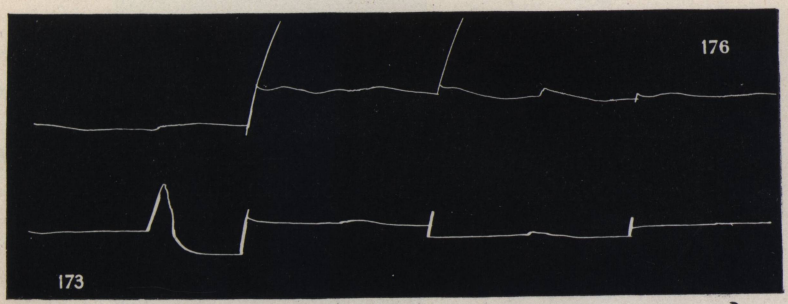
Again, a comparison of Inserts Nos. X, XI and XII shows three performances all having a Flinch Product of 9, giving respectively 0, .5 and 1 Withdrawal and having Flinch Product Rank Numbers of 135, 141 and 144.



Insert XIII.

Subject No. 34—White Man.

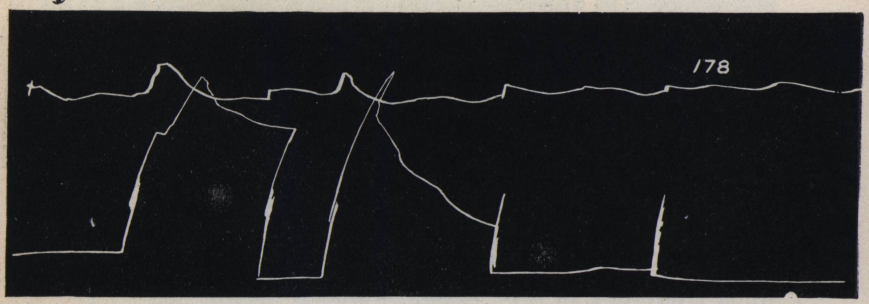
0 Withdrawals, Arm quiet 2nd trial, Breathing 8th. Flinch Product 16. F.P.R. No. 173.



Insert XIV.

Subject No. 173—Colored Woman.

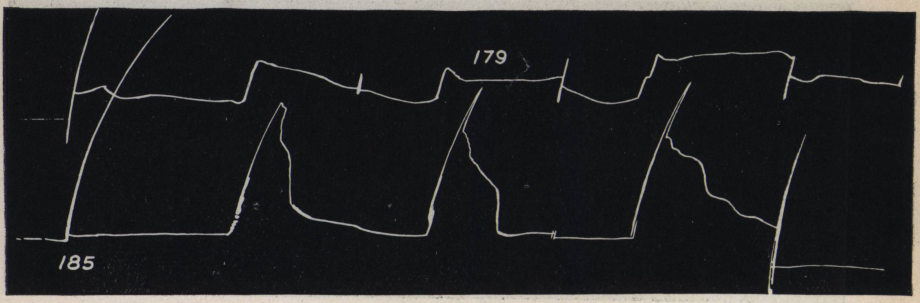
.5 Withdrawals, Arm quiet 4th trial, Breathing 4th. Flinch Product 16. F.P.R. No. 176.



Insert XV.

Subject No. 142—Colored Man.

2 Withdrawals, Arm quiet 4th trial, Breathing 4th. Flinch Product 16. F.P.R. No. 178.

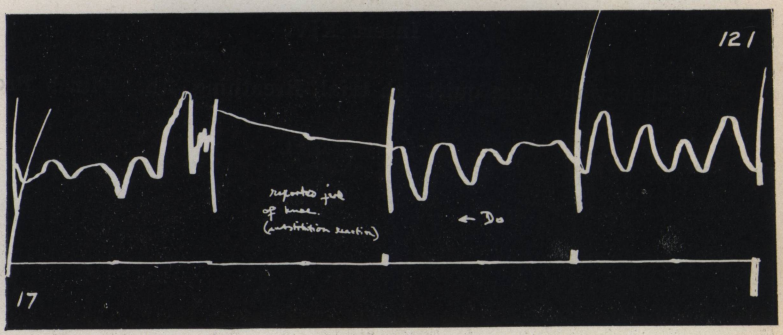


Insert XVI.

Subject No. 185—Colored Woman.

3 Withdrawals, Arm quiet 4th trial, Breathing 4th. Flinch Product 16. F.P.R. No. 179.

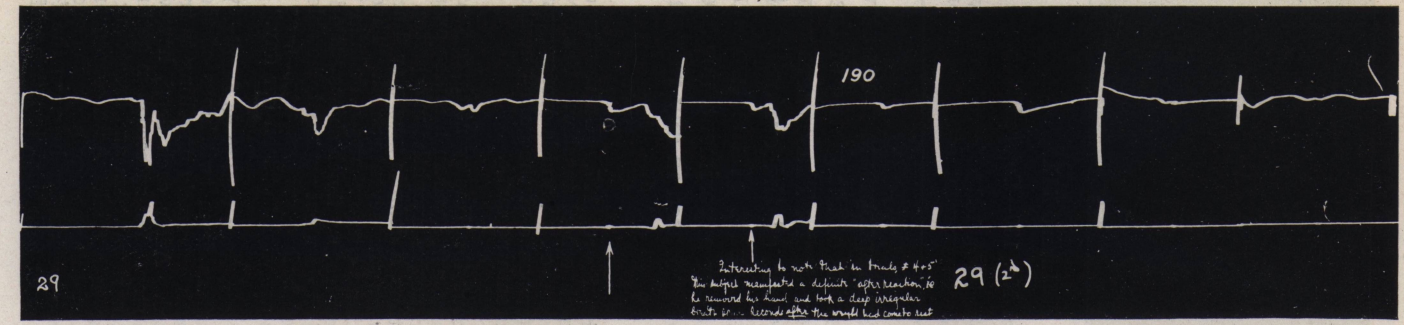
Graph Inserts XVII, XVIII and XIX do not properly belong to the former series, being atypical rather than "typical" responses to the guillotine situation,—each of which possess some special interest which is noted in the appropriately appended legend.



Insert XVII

Subject No. 17—White Man.

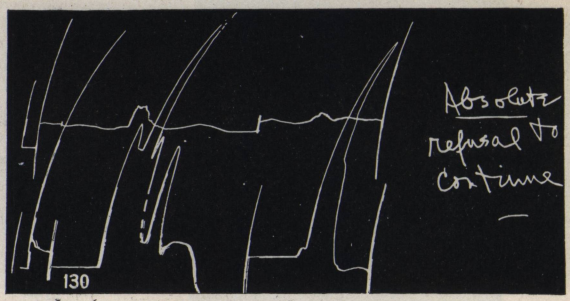
It is interesting to note in connection with this subject that, though he did not move his arm at the second trial, he did execute a sharp jerk of the *knee* immediately *after* the falling of the weight. It will be observed that during this second trial the subject was attempting to hold his breath. This jerking of the knee occurred again at the third trial, but not at the fourth. Needless to say, this jerking of the knee is not recorded in the graph.


190
29
Interesting to note that in trials # 4+5
the subject manifested a definite after-reaction, to
be removed her hand and took a deep irregular
breath or... seconds after the weight had come to rest
29 (2d)

Insert XVIII.

Subject No. 29—White Man.

In this graph note the "after-reaction" or twitching of the arm muscles occurring an instant *after* the falling of the weight. (Arrows indicate the instant at which the weight was dropped—bell rung, etc.)



Insert XIX.

Subject No. 130—Colored Man.

This is the graph of subject No. 130 referred to above who absolutely refused to continue with the experiment after the second trial.

This appears to be an appropriate point at which to make some mention of the results of the giving of the guillotine test to five "psychopathic" subjects. These cases were run through the laboratory simply out of the curiosity of the moment. They do not constitute a part of the two hundred subjects included in the body of our experiment, nor are the results of their performances incorporated in any way in our statistical processes:

Mr. T.:—Age 40, Alpha Score, 117. University education. Until recently employed as a high school teacher. Case record states that "he lacks ordinary adult reserve . . . and is oversuggestible, childish and circumstantial." His performance at the guillotine shows no withdrawals, arm quiet first time, breathing *sixth*.

Mrs. M. A. P.:—Age about 45. Has spent three years as a patient in a State Hospital, but is now employed in a minor executive capacity in a large hospital. Has an active exophthalmic goitre. I.Q., 81. Gives large .5 withdrawal first time, a definite muscular flinch the second time and immobilizes her arm on the seventh trial. Throughout all seven trials, however, the breathing curve shows a definite irregularity when the weight drops. This respiratory flinch shows little improvement from drop to drop, and the subject does not appear to be able to bring it under control. Test discontinued before subject passes, as the subject finds it a great strain and does not wish to "spoil her day."

R. P.:—Boy about fourteen from well-to-do family. Voluntary patient. Superior intelligence. Suffers from twitchings of the face, and stammers slightly. This boy was *extremely* unwilling to try the test. After much urging, he consented. After each drop, however, he repeatedly begged to be permitted to stop. We succeeded in getting five trials with the following result: 1 withdrawal, arm and breathing curves still showing definite flinches at the fifth trial. As a consequence, we made this boy promise to try this experiment again on the occasion of his next visit to the Institute. One week later he gave the following performance: .5 withdrawal, arm quiet fifth trial, breathing fifth.

Mr. A. P. N.:—A sturdy appearing young man of about 25. Superior intelligence, suffers from a fixed idea of a sexual character. Slight stammering. (From his appearance, one would have expected little reaction from this subject.) The following record was obtained: .5 withdrawal, arm quiet ninth trial, breathing ninth.

Mr. E. A.:—Young man of 30, of good family. Chronic forger. Sent by family for examination. Apparently an emotional conflict type of case. Record: arm quiet first trial, breathing second. (This is a type of graph not unlike many of our two hundred regular subjects.)

The chief point of interest in connection with the above cases would appear to be the fact that four out of five of the "institutional" subjects gave very poor records, falling at the extreme end of the distribution curve of our normal subjects. Had we tested fifty psychopathic cases with similar results—instead of five—we should feel justified in concluding that "mental disease" tends to result in a lessened control of the response to the guillotine situation.

The following tables—VI, VII and VIII present the original figures obtained in the Inhibition of Curiosity Test.

TABLE VI

SHOWING THE ABSOLUTE TIME REQUIRED TO COMPLETE FIRST TRIAL AT THE DEMONSTRATION BOARD—IN SECONDS

GROUPS	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90–94	95–99	100–104	105–109	110–114	115–119	120–124	125–129	130–134	135–139	140–144	145–149	150–154	155–159	160–164	165–169	170–174	175–179	180–184	185–189	190–194	195–199	200–204	205–209	210–214	215–219	220–224	225–229	230–234	235–239	240–244	245–249	250–254	255–259	260 —
A: ENTIRE 200	3	4	7	12	9	14	18	11	15	8	9	11	9	9	7	9	3	7	3	2	3	1	2	1	2	2	2	2	0	2	1	0	0	5	0	1	0	0	0	0	0	2	0	1	0	3
B: 100 WHITES	3	4	7	12	8	11	15	6	7	5	4	3	3	2	3	1	0	2	1	0	0	1	0	0	0	0	1	1																			
C: 100 BLACKS					1	3	3	5	8	3	5	8	6	7	4	8	3	5	2	2	3	0	2	1	2	2	1	1	0	2	1	0	0	5	0	1	0	0	0	0	0	2	0	1	0	3
D: 100 MEN	1	2	3	4	5	6	11	5	6	5	6	5	8	3	6	1	1	3	2	1	2	0	1	1	1	1	1	1	0	2	1	0	0	2	0	0	0	0	0	0	0	1	0	1	0	1
E: 100 WOMEN	2	2	4	8	4	8	7	6	9	3	3	6	1	6	1	8	2	4	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	3	0	1	0	0	0	0	0	1	0	0	0	2
F: 50 WHITE MEN	1	2	3	4	5	5	9	2	3	3	3	2	3	0	3	0	0	1	1																												
G: 50 WHITE WOMEN	2	2	4	8	3	6	6	4	4	2	1	1	0	2	0	1	0	1	0	0	0	1	0	0	0	0	1	1																			
H: 50 BLACK MEN						1	2	3	3	2	3	3	5	3	3	1	1	2	1	1	2	0	1	1	1	1	1	1	0	2	1	0	0	2	0	0	0	0	0	0	0	1	0	1	0	1
I: 50 BLACK WOMEN					1	2	1	2	5	1	2	5	1	4	1	7	2	3	1	1	1	0	1	0	1	1	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	1	0	0	0	2

TABLE VII

SHOWING THE DISTRIBUTION ACCORDING TO TIME REQUIRED TO COUNT THE PLAIN SERIES—IN SECONDS

GROUPS	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124	125-129	130-134	135-139	140-144	145-149	150-154	155-159	160-164	165-169	170-174	175-179	180-184	185-189	190-194	195-199	200-204
A: ENTIRE 200	4	9	23	17	9	21	14	25	8	13	12	7	5	5	2	5		4	3	5		2	1			1				1		1	1	1
B: 100 WHITES	4	8	22	15	7	15	9	15	2	1	1	1																						
C: 100 BLACKS		1	1	2	2	6	5	10	6	12	11	6	5	5	2	5		4	3	5		2	1			1				1		1	1	1
D: 100 MEN	1	6	9	8	5	12	9	12	4	4	5	4	4	3	1	3			2	3		2	1											1
E: 100 WOMEN	3	3	14	9	4	9	5	13	4	9	7	3	1	2	1	2		4	1	2						1				1		1	1	
F: 50 WHITE MEN	1	5	9	6	4	8	6	7	1	1	1	1																						
G: 50 WHITE WOMEN	3	3	13	9	3	7	3	8	1																									
H: 50 BLACK MEN		1		2	1	4	3	5	3	3	4	3	4	3	1	3			2	3		2	1										1
I: 50 BLACK WOMEN			1		1	2	2	5	3	9	7	3	1	2	1	2		4	1	2						1				1		1	1	

Table VIII shows the distribution of subjects on the basis of *Percentage Retardation.*

An individual's percentage retardation was calculated as follows: The time required by him to count the plain series of symbols was subtracted from the time which he required to count the pictured series. The percentage which this *difference* constituted of his time on the plain series was termed his "percentage retardation." Thus, if a subject counted the plain series in one hundred seconds and the pictured series in 120 seconds, his "% R" was + 20. If another subject, counting the plain series in one hundred seconds, counted the pictured series in 80 seconds, his % R would be – 20, etc.

TABLE VIII

PERCENTAGE RETARDATION

GROUPS	35 TO -39	-30 TO -34	-25 TO -29	-20 TO -24	-15 TO -19	-10 TO -14	-5 TO -9	0 TO -49	0	0 TO +49	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75 - 79	80 - 84	85 - 89	90 TO 94
A ENTIRE 200	1	2	1	4	7	12	16	18	2	31	23	18	16	18	12	5	5	1	4	1							1	1
B 100 WHITES		1		1	5	5	10	9	1	16	13	7	10	7	4	3	3		2								1	
C 100 BLACKS	1	1	1	3	2	7	6	9	1	13	10	11	6	11	8	2	2	1	2	1								1
D 100 MEN	1			1	3	3	3	6	1	17	13	8	13	12	6	3	4	1	3									1
E 100 WOMEN		2	1	3	4	9	13	12	1	14	10	10	3	6	6	2	1		1	1							1	
F: 50 WHITE MEN					2	2	1	3		10	8	3	7	5	2	3	2		2									
G: 50 WHITE WOMEN		1		1	3	3	9	6	1	8	5	4	3	2	2		1										1	
H: 50 BLACK MEN	1			1	1	1	2	3	1	7	5	5	6	7	4		2	1	1									1
I: 50 BLACK WOMEN		1	1	2	1	6	4	6		6	5	6		4	4	2	.		1	1								

The two tables next following—numbers IX and X—present the distribution of the subjects on the basis of intelligence. With their presentation, SERIES I of the data is completed.

In compiling Table X, two liberties were taken with the figures. Firstly, the M.A.'s obtained by Stanford examination were transmuted into Army letter grades, the data employed in this transition being the table given on page 100 of Yoakum and Yerkes' "Army Mental Tests." Secondly, insomuch as Group E as established by the Army, included such a large number of our negroes, a further division of this group was made into E and E– in order more fully to represent the distribution. As used above, Group E includes M.A.'s 9.5 to *8* instead of *all* below 9.5, E– containing all below 8. This is a purely arbitrary division created solely because of and for convenience in representing the facts of this particular distribution.

TABLE IX

I. Q.

GROUPS	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124
A: ENTIRE 200	4	4	18	15	25	18	12	15	9	9	11	15	11	14	7	7	6
B: 100 WHITES				2	2	4	4	8	5	8	10	13	10	14	7	7	6
C: 100 BLACKS	4	4	18	13	23	14	8	7	4	1	1	2	1				
D: 100 MEN	2	3	9	7	14	10	9	5	6	3	3	5	5	7	2	5	5
E: 100 WOMEN	2	1	9	8	11	8	3	10	3	6	8	10	6	7	5	2	1
F: 50 WHITE MEN				2	1	3	4	4	4	2	3	4	4	7	2	5	5
G: 50 WHITE WOMEN					1	1		4	1	6	7	9	6	7	5	2	1
H: 50 BLACK MEN	2	3	9	5	13	7	5	1	2	1		1	1				
I: 50 BLACK WOMEN	2	1	9	8	10	7	3	6	2		1	1					

TABLE X

GROUPS	LETTER GRADES							
	E-	E	D	C-	C	C+	B	A
A: ENTIRE 200	8	30	42	31	29	20	21	19
B: 100 WHITES		1	7	12	23	18	20	19
C: 100 BLACKS	8	29	35	19	6	2	1	
D: 100 MEN	5	14	24	16	12	6	11	12
E: 100 WOMEN	3	16	18	15	17	14	10	7
F: 50 WHITE MEN		1	5	8	9	5	10	12
G: 50 WHITE WOMEN			2	4	14	13	10	7
H: 50 BLACK MEN	5	13	19	8	3	1	1	
I: 50 BLACK WOMEN	3	16	16	11	3	1		

SERIES II

In this series will be presented tables showing the correlations existing between the various separately measured traits whose distributions have already been set forth in the tables of SERIES I. Except where otherwise noted, the coefficients of correlation have been calculated by the use of Pearson's product-moment formula.

At first thought, one might expect that the correlation between arm movements and the number of withdrawals would be very close to 1.00. As a matter of fact, however, many individuals who gave no withdrawal, did show arm flinches for a very considerable number of trials; whereas, other individuals who gave a complete withdrawal (or two withdrawals as the case might be) were able on the trial immediately following to effect a perfect immobilization of the arm.

Table XI following, shows in successive columns the correlations existing between (1) The number of withdrawals and the "Arm Score" (number of trial at which arm first remained quiet)—(2) The number of withdrawals and the "Breathing Score" (similarly reckoned)—(3) The number of withdrawals and the Flinch Product,* and (4) The Arm Scores and the Breathing Scores.

TABLE XI

Group		Withdrawals and Arm	Withdrawals and Breathing	Withdrawals and Flinch Prod.	Arm and Breathing
A	Entire 200	.52 ±.03	.42 ±.03	.37 ±.04	.78 ±.01
B	100 whites	.43 ±.05	.31 ±.06	.38 ±.05	.64 ±.03
C	100 blacks	.57 ±.04	.54 ±.04	.55 ±.04	.68 ±.03
D	100 men	.38 ±.05	.46 ±.05	.27 ±.06	.81 ±.02
E	100 women	.42 ±.05	.38 ±.05	.46 ±.05	.78 ±.02
F	50 white men	.25 ±.08	.36 ±.08	.38 ±.08	.71 ±.04
G	50 white women	.45 ±.07	.37 ±.08	.47 ±.07	.68 ±.05
H	50 black men	.73 ±.04	.64 ±.05	.50 ±.07	.70 ±.04
I	50 black women	.44 ±.07	.22 ±.09	.68 ±.05	.67 ±.05

Table XII attempts to show the relations existing between the performances given at the guillotine and the other measurements taken in the laboratory. Percentage Retardation† is the measure used to represent the performance in the Inhibition of Curiosity Test; and I.Q. is the measure employed to

*For definition of Flinch Product see pgs. 38, 39, above.

†For definition of Percentage Retardation, see pg. 56, above.

represent the result of the intelligence tests. Each of these is correlated first with the number of withdrawals and secondly with the Flinch Products, the resulting coefficients being as follows:

TABLE XII

Group		Withdrawals and %R	Withdrawals and I.Q.[1]	Flinch Product and %R	Flinch Product and I.Q.
A	Entire 200	.17 ±.04	–.01 ±.04	.19 ±.04	.13 ±.04
B	100 whites	.00 ±.06	–.25 ±.06	.05 ±.06	–.20 ±.06
C	100 blacks	.25 ±.08	–.20 ±.06	.26 ±.06	.02 ±.06
D	100 men	.25 ±.06	–.39 ±.05	.28 ±.06	.16 ±.06
E	100 women	.10 ±.06	–.14 ±.06	.16 ±.06	.19 ±.06
F	50 white men	–.10 ±.09	–.46 ±.07	.19 ±.09	–.33 ±.08
G	50 white women	.12 ±.09	–.25 ±.08	.11 ±.09	.05 ±.09
H	50 black men	.40 ±.08	–.20 ±.09	.35 ±.08	.02 ±.09
I	50 black women	.00 ±.09	–.16 ±.09	.29 ±.08	.00 ±.09

Note: The last two columns of Table XII were calculated by Pearson's "Cosine Pi" method, an individual "Flinch Product Rank Number" having been assigned to each graph, in accordance with the principles already set forth above in connection with the presentation of the Graph Inserts. (See also legends under Graph Inserts IV, V, VI, et al.)

Table XIII gives the correlations existing between I.Q. and two different factors, both of which are derived from the Inhibition of Curiosity Test,—the correlations between I.Q. and the individual variable factors measured in the guillotine performance having already been set forth in Table XII.

TABLE XIII

Group		I.Q. and Time Required to Count Symbols, 1st Trial at Demonstration Board	I.Q. and Percentage Retardation
A	Entire 200	–.35 ±.04	–.07 ±.04
B	100 whites	–.33 ±.06	–.10 ±.06
C	100 blacks	–.03 ±.06	–.06 ±.06
D	100 men	–.57 ±.04	.14 ±.06
E	100 women	–.65 ±.03	–.18 ±.06
F	50 white men	–.32 ±.08	–.15 ±.09
G	50 white women	–.28 ±.08	–.24 ±.08
H	50 black men	.00 ±.09	.01 ±.09
I	50 black women	–.10 ±.09	–.05 ±.09

[1]See, in this connection, June E. Downey's Will Profile (Univ. of Wyoming Bulletin for Nov. 1919, Vol. XVI, No. 4b, pg. 39) wherein the author, employing 25 subjects, obtains a coefficient of correlation of +.15 between "volitional capacity" as measured by the Will Profile tests and intelligence as measured by Army Alpha.

SERIES III

As stated at the opening of the chapter, the data set forth in this series are irrelevant to the principal thesis and are herein included solely because of their intrinsic interest.

Each negro subject who passed through the laboratory was given a "color rating" on the following basis:

1—So light as to be possibly mistaken for a white person at first glance.
2—Very light—but instantly recognizable as a colored person.
3—Medium dark.
4—Very dark.
5—Pitch black—"African" in appearance.

Every effort was made in giving these ratings to be very accurate and objective.

It is interesting to note the relation shown between this color rating and the I.Q. score as it is worked out for our hundred subjects. The results of this comparison are here set forth by means of averages only, but as they represent the mid-points of their distributions fairly well, they may be accepted as adequately setting forth the facts.

TABLE XIV

SHOWING THE AVERAGE I. Q. OF THE COLOR GROUPS

Color Group	Men		Women		Both Together	
1	66	1*	76	1	72	2
2	68.5	7	68.7	13	68.7	20
3	65.2	11	66.1	18	65.7	29
4	62.0	19	57.2	14	60.0	33
5	60.25	12	59.5	4	60.0	16

*Figure indicates number of cases.

Also, en passant, there were made up three "Opinion Lists," so called, in the following manner: Three representative colored men of the local community were selected. To each of these men was mailed a list of all the colored persons who had been examined in our laboratory, and each was requested to place a number after the name of each person on the list with whom he was acquainted. The number was to express his opinion of that person's intelligence in accordance with the following code:

5—Superior intelligence
4—Above average intelligence
3—Average
2—Below average intelligence
1—Inferior intelligence

The three lists were sent respectively to (1) The principal of the local colored grammar school (our own subject No. 111) (2) The pastor of the largest local colored church and (3) A practicing veterinary. Table XV gives the results.

TABLE XV

SHOWING CORRELATION BETWEEN I.Q. AND LOCAL OPINION AS TO INTELLIGENCE

Judge	No. of Cases Judged	Coefficient of Correlation
School Principal	63	.67 ±.04
Pastor	100*	.23 ±.06
Veterinary	53	.56 ±.06

*This judge evidently was injudicious enough to express his opinion of every subject regardless of whether or not he was acquainted with the individual.

Turning next to a consideration of the introspection sheets, it may prove of some interest to inspect the responses given by the different race and sex groups in order to observe whether or not any constant differences shall appear. It should be stated here that the introspection data are incomplete. In some cases, especially among the whites, the time of the subject was so limited that it was necessary for him to return to his work immediately at the completion of the test. In other cases, more characteristically among the negroes, the paucity of the subject's intelligence precluded all possibility of obtaining anything like a reliable introspective report.

Considering first the results of our attempt to create an illusion that the weight had hit the subject's hand by permitting an induced current of low voltage to run through the subject's hand the moment the weight fell,—the outstanding result is that the great majority of our subjects—160 of them, to be accurate, never noticed the electric shock at all. This in all probability was due to the general confusion of the mental state at the moment in question. Of the 40 who did give some report concerning the stimulus, 14 of them thought that the weight actually hit them; 8 were more or less confused as to

exactly what it was that had happened. Though they knew that the weight had not hit them, they yet recognized that *something* had occurred that involved their hand, though failing to identify the stimulus as electricity; the remaining 18 were unshaken in their certainty that a current had passed through their hand.

Of the first class, i.e., those who actually experienced the illusion, 4 were white and 10 colored. In both cases, however, these groups were below their racial average in I.Q., 7 points in the case of the whites and 2 points in the case of the blacks, though being practically at average with respect to their F.P.'s. The intermediate class who, though recognizing something, failed to identify the stimulus as electricity, were divided in the ratio of 1 to 3, two whites and six colored. Here the I.Q.'s for racial groups averaged *higher* than their respective race averages, though not so much higher as in the last class, i.e., those who definitely recognized the stimulus as being electrical. In both the black and white groups for both the intermediate class and those who recognized the stimulus as being electrical, F.P. was slightly higher than the norm;—especially in the case of the whites who recognized the stimulus as being electrical, in which case the F.P. was *double* that of the norm; i.e. 12 instead of 6. The only case in this division where any noteworthy sex difference shows up, appears in the difference between the I.Q.'s of the men and the women who definitely recognized the stimulus as being electrical, which ran as follows: F,—113.4; G,—97.6; H,—81.6; I,—68.8, —the men who recognized the electrical character of the stimulus averaging in both racial groups *much* above the median I.Q., and the women slightly above. With respect to the distribution of withdrawals among these 3 classes, the first,—or those who actually experienced the illusion—shows about the same peppering of withdrawals that characterizes the whole 200 subjects. The class who recognized the stimulus as electrical showed just a few less than its quota of withdrawals, whereas, the intermediate class gave but one complete withdrawal for 8 subjects, this being about 1/3 as many as this group would have been entitled to on the basis of the total figures.

In response to the question whether or not the subject thought of the statement on the wall to the effect that no harm would result to him from any part of our experiment, the responses are of interest for two particular characteristics. Firstly, the percentage of whites who recalled the statement during the course of the experiment was decidedly lower than the percentage of blacks similarly so reporting. Of 69 whites reporting, only 33 stated that they called the statement to mind clearly during the progress of the test; whereas of 44 blacks reporting, 31 when asked whether they recalled the statement, responded in the affirmative. Secondly, the F.P.'s of those who recalled the statement were markedly and consistently higher throughout than the median F.P. of their racial norms. This latter contrast was perhaps more marked among the whites than among the blacks.

The F.P. of our affirmative group among the whites is 19.9 as compared with a normal of 6, and 5.7 for the blacks as compared with a normal for them of 4. The intelligence of the groups replying in the affirmative as compared with the total number of subjects shows an altogether negligible difference, being 3 points of I.Q. higher for whites and 1 point higher among the blacks. Moreover, both among the whites and among the blacks the two groups—those claiming to have remembered the statement and those claiming not to have remembered it, show about the same number of withdrawals.

The question asked each subject, whether or not he had any idea what was going to happen, elicited some entertaining replies which are herewith tabulated by groups:

Group F—white men—Of 41 subjects reporting, 21 claimed to have had no idea whatsoever; 8 claimed a more or less correct analysis of the instrument. (The average I.Q. for this group of 8 was 111.5); 4 stated specifically that they expected an electrical shock; 2 anticipated an explosion, and 1 "a noise of some sort." Of the remaining 6, one (I.Q. 66, F.P. 12, W. 5) expected the instrument might cut off his hand. Another (I.Q. 70, F.P. 9, W. 0) anticipated an examination for his sanity, and one (I.Q. 122, F.P. 9, W. 0) expected that we would ask him to place his head between the standards.

Group G—white women—32 reports; 18 no idea; 6 again expected an electrical shock; and 3 gave a more or less correct analysis of the instrument (average I.Q. of these 3 subjects being 112.3). Again, one (I.Q. 113, F.P. 2, W. 0) expected a report; one (I.Q. 100, F.P. 12, W. 0) "something calculated to frighten;" one (I.Q. 109, F.P. 6, W. 5) "a conflagration"; and finally, one (I.Q. 113, F.P. 12, W. 0) stated that he had expected "something much worse." Among the bizarre anticipations, one (I.Q. 78, F.P. 6, W. 0) expected an X-ray of his hand to be taken.

Group H—black men—Of 39 reports, 15 stated that they had no idea what might happen; 9 reported a definite fear of electricity; 5 expected the weight to hit their hand; and 4 gave a more or less correct analysis of the instrument. For the group of 5 who expected the weight to hit their hand, the average I.Q. is 66 (3 points above average), but the average F.P. was 6 (50% above average). For the 4 who gave a more or less correct analysis, however, the average I.Q. was 75.7. Three expected to be asked to put their head between the standards; one expected a "test on books"; one to have his picture taken for the census; and one, looking at the kymograph, exclaimed, "Do you grind that der crank over dere?"

Group I—black women—31 reports: 15 had no idea. Again, 5 expected the weight to fall on and mash their hands. This group of 5 averaged 55 I.Q. and 9.2 F.P. It is interesting to note that all but two of these five actually withdrew their hands; one of this three giving 3 withdrawals, while the fourth subject gave a .5 withdrawal. Three guessed that the instrument was a weighing machine; 2 (average I.Q. 66.5, average F.P. 9.5, W. both 0) gave a partially correct analysis. Two made the non-committal statement that they expected "some kind of an examination"; one thought that we were going to see how stout she was; one expected a needle or pin to prick her; one "something to turn hot and cold"; and another expected "to have some fun."

In response to the question *"Did you feel a real desire to pull your hand away?"* we received four types of responses. Some of the subjects simply said "Yes," and others gave a

deliberate "No." Quite a number said "No" and then qualified their statement in one way or another, whereas a few employed the word "unconsciously" or "subconsciously," or some equivalent thereof. The phrases most often used to qualify the answer "No," were: "No, I just made up my mind to do it"; "No, you told me not to"; "No, not after I once put my hand there," etc., etc.

Tabulating these replies together with I.Q., F. P. and W., we obtain the following figures (again employing averages to represent our groups).

TABLE XVI

Group	Yes			No			No, Qualified			Unconsciously		
	I. Q.	F. P.	W.	I. Q.	F. P.	W.	I. Q.	F. P.	W.	I. Q.	F. P	W.
F: 50 white men	*15 84.5	28.4	.5–5 1–4	*14 94.5	15.3	.5–1	*12 101.6	13.0	.5–1	*3 111.3	10.6	.5–2
G: 50 white women	*15 98.1	23.0	.5–3 1–4 2–1	*8 91.1	12.7	.5–1	*7 99.4	10.0	1–1	*5 105.8	14	1.5–1
H: 50 black men	*16 59.6	6.2	.5–2 1–6 1.5–1 2–1	*9 71.1	4.2	.5–1 1 –2	*2 70.5	8.0	1–1	*1 70.0	9	1–1
I: 50 black women	*14 65.3	5.6	.5–1 1–4 3–1	*6 63.1	4.0		*3 53.0	8.6	1–1	*0		

*Figure indicates number of cases.

Interpretation of Table XVI: In reply to the question, "Did you feel a real desire to pull your hand away?" the white men (Group F) answered as follows: 15 replied in the affirmative, 14 in the negative, 12 in the negative with the addition of some qualifying clause, and 3 gave the "unconsciously" type of reply. The average I. Q. of the 15 who replied in the affirmative is 84.5, the average F. P., 28.4. Finally of this group of 15, 5 gave a .5 withdrawal and 4 a single withdrawal, etc.

Closely related to the question "Did you feel a real desire to pull your hand away?" is the next following query *"Did you feel that you had to exercise self-control in order not to pull your hand away or move your arm?"* Table XVII presents the average I.Q., F.P. and withdrawal score of the groups, giving different answers to the self-control question.

TABLE XVII

Group	Yes Slightly a Little Bit			No			No, Qualified		
	I.Q.	F.P.	W.	I.Q.	F.P.	W.	I.Q.	F.P.	W.
F: 50 white men	*34 94.2	20.4	.5–7 1–4	*3 88.0	32.6	.5–1	*7 97.2	4.5	
G: 50 white women	*25 99.7	20.6	.5–3 1–3 1.5–1 2–1	*8 88.3	7.0	.5–1 1–1	*5 104.6	7.6	1–1
H: 50 black men	*21 62.3	6.0	.5–2 1–7 1.5–1 2–1	*5 74.2	5	.5–1 1–1	*9 61.0	4.4	1–1
I: 50 black women	*11 63.4	6.8	.5–2 1–3	*4 71.7	1.7	—	*18 63.7	5.6	.5–3 1–2

*Figure indicates number of cases.
Table XVII is read just as was Table XVI.

At first thought, one would scarcely expect any subject to reply that though he did not experience any desire to withdraw his hand, he nevertheless *did* have to exercise self-control —or vice versa. In spite, however, of the apparent absurdity of such a report, no less than 25 out of 82 whites reporting, did give such a contradiction, though, indeed, out of 68 blacks reporting only 4 gave this apparently contradictory introspection. Surely, though, we may assume that the introspections of the whites are the more reliable!

Examination of the replies given by the 25 whites above referred to as making contradictory introspective reports, shows that they may be classified under four groups: (1) Those who stated that they had no desire to pull their hand away but had to exercise self-control; (2) Those who *qualified* their negative answer to the desire question, but also replied to the self-control question with a simple affirmative; (3) Those who gave the "subconsciously" type of response to the desire question with "yes" to the self-control question; and (4) One lone individual stated that he did experience a desire to pull his hand away, but did *not* have to exercise self-control to keep it there.

The average I.Q. for the entire group of whites giving contradictory reports was 99.4, the average F.P. being 10.8. Of this same group, only one—the one above referred to as stating that he did experience a desire, but did not have to exercise self-control—gave any withdrawal whatsoever. The variations in I.Q. and F.P. between the sub-groups above specified were so small as to be negligible. Of the four colored subjects giving contradictory reports, all fall in the first group, i.e., those responding with a simple "No" to the desired question, and an equally unelaborated "Yes" to the self-control question. In this group again both I.Q. and F.P. were above average while the withdrawal score was distinctly low, the figures for this group of four being Av. I.Q. 71.75, F.P. 4.5, W. 1 out of 4.

The replies to the question "How did the bell affect you?" fell for the most part into 2 great groups: (1) "It didn't affect me at all," or words to that effect, and (2) "It frightened me a little bit," or some variant thereof—"startled" being the word appearing with next greater frequency. A few scattered responses occurred in which some subjects stated that it made the test easier, because it warned them when the weight was about to fall, whereas others said that it made the test *harder,* by adding to the general confusion. One subject (I.Q. 93, F.P. 56, W. O.) on being asked the question about the bell, appeared greatly surprised when assured that a bell had been rung, and claimed, after the bell was rung again to assist her memory, that so far as she could recall, she had not heard it at all. Search for any characteristically regular difference in the I.Q.'s or F.P.'s or withdrawal scores of the differently replying groups reveals no findings in response to the bell question. The only thought which reflection upon these replies engenders is one of surprise that there should not have been more responses of an intermediate nature. Adopting the language of McDougall, we would say that the sudden sound of a loud bell apparently acts as the specific excitant of fear with very much greater certainty in some people than in others, who, as a result of modern civilized environment, have come, through a process of negative adaptation, to a condition where the native afferent inlet of a loud sound as the specific excitant of fear no longer functions. In this connection the writer recalls the reply of one young lady—a nurse in training—to the bell question, to the effect that it did not startle her, but simply reminded her of the rising bell in the nurses' dormitory.

Perusal of the replies to the questions intended to draw out the introspections of the subjects concerning the inhibition of curiosity test, proved on the whole disappointing, and they

may be dismissed with the briefest mention. They reveal the altogether to-be-expected psychological mechanisms of the inhibitory effects of surprise on the one hand, and the stimulating effect of moderate distraction on the other. In other words, those who gave a positive percentage retardation—to the extent to which they explained their performance at all—said that they were so surprised when the curtain was drawn aside that it took them a minute or two before they could continue with the counting,—and their performance bore out the truth of their introspection! Of those who gave a negative percentage retardation, only a very few gave any satisfactory introspections whatsoever; but those who did said (in the words of subject No. 124) "I went faster because I had to exercise more self-control in order to keep from looking at those pictures," or again subject No. 72, "My mind might have been more concentrated on what I was doing because you told me not to let anything disturb me,"—or something psychologically equivalent thereto.

In concluding this section on the introspections, we will present in toto the introspection sheet of subject No. 72, as being unusually complete, consistent and enlightening.

INTROSPECTION SHEET

Name: Laura A..... Date: Nov. 19, 1920. Subject No. 72.

Attitude toward experiment as a whole:

Willing to come because naturally curious.

Entering attitude:

Calm and curious.

Frightened?

No.

Did you think the weight hit you the first time?—the second time?

I knew the weight never hit.

Did the statement on the wall come to your mind at any time during the progress of the tests?

No, the statement never came to my mind because I felt sure of that before I came.

Did you have any idea what was going to happen?

I naturally thought before the experiment that if anything happened it would want to make me pull my hand away. However, I was so concentrated on holding my hand on the board that, if there was any desire to pull my hand away, I was not conscious of it.

Did you feel that you had to exercise any self-control in order not to pull your hand away or move your arm?

Yes, I had to exercise self-control,—not at the time, however, but before starting the test.

How did the bell affect you?

It startled me slightly; but the test would have been harder without it because, as it was, I didn't notice the weight. Without it I am sure I would have.

Additional voluntary introspective report:

I am always more easily disturbed by noises.

* * * *

Was the retardation physiological or psychological?

(Not answered because subject counted pictured series more rapidly than plain series.)

Additional voluntary introspective report:

My mind might have been more concentrated on what I was doing because you told me not to let anything disturb me.

Finally, under the head of Data, seems properly to belong some statement concerning the general behavior of the subjects throughout the test as a whole. Most striking was the contrast between the attitude of the negroes on entering the laboratory and the attitude of the whites at the corresponding moment. The negro entered the room cautiously with eyes wide open and fluctuating in expression between fear and curiosity, not untouched with negative self feeling—all of which, however, soon gave way to a more placid, somewhat stolid attitude as the subject became adapted to the environment and busy with the routine of the tests. The white group, however, entered the room with an attitude of genial curiosity, the fear reaction in the majority of cases well held in check by an obvious self-confidence, and in *all* cases quite effectively held under control.

Further on in the test—when the subject was moved from one point in the room to another—a still more marked difference between the two racial groups appeared. The whites—or at least a great many of them, as soon as their attention was relaxed between portions of the experiment, at once began looking about the room examining the apparatus and testing their assumptions concerning its functions with a stream of questions, some of them very astute, others seemingly obtuse. So marked was this tendency among the whites, that it was necessary to carefully shield from the view of the subject any and all tell-tale portions of the mechanism from an observation of which he might conceivably deduce conclusions that might invalidate the experiment. All such behavior among the blacks was *conspicuous by its absence.* Apparently the idea of inspecting the apparatus never entered their heads. Indeed, one of our student assistants in the South, unsolicited, volunteered the comment: "Why, you can lead some of those darkies right through the switch room and let them stare at the switches and they'll follow you blindly without ever seeming to think about what the switches might be for!" And her comment epitomizes very well indeed the behavior of the negro in this respect.

In short, the blacks seemed to give themselves up more completely to the experiment than did the whites.

While at the guillotine itself a few subjects were noticed to give certain definite "by-reactions." These appeared equally among both racial groups. The two most frequent and char-

acteristic of these "by-reactions" were (1) The turning aside of the head, after one or more drops of the weight, in a definite effort to avoid seeing it as it descended. One subject (I.Q. 122; F. P. 4; W. 0) who resorted to this device, reported in his introspection sheet that he deliberately engaged himself into subdividing a building he could see across the way into imaginary apartments. The second "by-reaction" is of a somewhat different character and consists of a group of "substitution reactions," the most common of which is the jerking of the knee at the time of the falling of the weight. One subject who so reacted, reported in her introspection sheet, "I simply *had* to do something."

It should be commented that, as a group, these "by-reactions" were of great assistance to the subjects who adopted them and were regularly promptly followed by a "passing" performance at the guillotine.

CHAPTER VI

Interpretation of Data and Conclusions

Up to this point in the development of our topic, we have restricted ourselves almost exclusively to a description of our apparatus and methods and a statement of our findings. The temptation to theorize upon the basis of these later is great. It is the purpose of this chapter, however, merely to pass in review the data presented in the previous chapter and to draw to the reader's attention those findings upon which the experimenter, in the light of his laboratory experience, would wish to place emphasis and to call his attention also to certain relationships which are not over-obvious as one merely peruses the data themselves. Many, indeed, of the tables and facts above presented will, however, be left uncommented upon, to speak for themselves and to fit into the reader's own scheme of things psychological as he sees best fit to place them.

Before discussing these data, it appears proper to take a stand upon the anthropo-sociological question of "race differences." Clearly, to establish a "difference between the races" is a very much simpler and less fundamental accomplishment than to establish a "race difference." This latter term implies that the difference is an innate psychological one, characteristic of and due to the fact of race, and of race alone, and its experimental determination must necessarily involve the testing of two groups of subjects—black and white—who have been living under *like environmental and cultural conditions!* The establishment of a "difference between the races," on the other hand, may be accomplished by the testing of two groups of subjects such as have been described in Chapter IV above. *Such* a "difference" it is believed the data set forth in this work demonstrate. The question of in how far these "differences between the races" are due to "race differences" and in how far they may properly be explainable upon the basis of differences in cultural level which, in turn, are the resultants of historical currents in the direction of whose flow chance plays such a large part,—this question is left to the anthropol-

ogist and sociologist. What we have here attempted to accomplish is to posit certain psychological differences between the two races as they exist among us to-day, having accepted the well-known environmental and cultural differences as an inevitable condition to the obtaining of subjects.

It is the writer's *opinion* (though he should never attempt to deduce the same from the data of this work) that these differences are due to *both* of the categories of causes above mentioned, though he would incline to the view that the psychological factors are the more fundamental.

Moreover, it may be added that the data and conclusions here presented are given without prejudice or leanings upon the question of racial potential, that is: Has the negro a long evolutionary development yet to live through, whereas the white man has absolutely or practically reached the maximum of his evolutionary potentiality, so that in ages to come the black man shall be the unquestioned superior of the white man, etc., etc.?

Interesting and important as the questions indicated in the last two paragraphs may be, they are nevertheless of a somewhat more academic character than is the purpose of this experiment. So slow, from the point of view of man, is the progress of cultural development and evolutionary growth that an accurate description of an existing "difference between the races" will almost certainly be of considerable value for many generations to come,—whatever may be the answer to the biological and anthropological questions that we have asked. It is such a description of differences that is afforded by the data of this work.

Considering the data in the order in which they appear above, we come first to the tables presenting the distributions of the withdrawals, and the arm and breathing scores. The outstanding result here is that the whites scatter their flinches—both arm and breathing—over a much greater range than do the blacks; but that, in spite of this, the blacks give both a greater number of single withdrawals and a greater number of individuals giving more than one withdrawal,—than do the whites. In other words, THE WHITE MAN OR WOMAN GAVE A LESSER REACTION ON THE FIRST DROP THAN DID THE NEGRO; BUT HE "COMPENSATED" THEREFOR BY REQUIRING SEVERAL MORE TRIALS,

ON THE AVERAGE, THAN DID THE NEGRO IN ORDER TO ACHIEVE A PASSING PERFORMANCE. THE NEGRO, ON THE OTHER HAND, GAVE A COMPARATIVELY VIOLENT RESPONSE ON THE FIRST (AND SOMETIMES ON THE SECOND) DROP, WHICH HE PROMPTLY FOLLOWED BY A PERFECT PERFORMANCE. Thus, the negro group shows, on the whole, a very much lower Flinch Product rating than does the white group.[1] However, it would hardly be fair to transpose this last sentence to read that the negro group averaged less average "absolute volume of movement" in response to the test than did the white. The lower F.P. rating of the negro simply means that the negro concentrated his movement into the first part of his reaction.

In turning these facts over in one's mind, one is tempted to borrow for the moment the point of view of pathological psychology and wonder to what extent the fact that the negro gets all of his responses "out of his system" early in the game, enables him to achieve a perfect performance at a comparatively early drop. Conversely, might not the white man perhaps pass the test at an earlier drop if he frankly "let go" the first time instead of putting forth his best efforts from the very start? In a way, the more naive performances seem to accomplish more successfully the task set by the experimenter in his directions to the subject. Of course, if our scoring had been done on the "total volume of movement" basis, there is no telling what effect this method of "immediate expression" would have had upon the score. This would seem to offer a most interesting problem for further experiment.

It also appears from a comparison of Tables III and IV that BOTH GROUPS FOUND IT EASIER TO IMMOBILIZE THE ARM THAN TO EXERCISE A SIMILAR CONTROL OVER THE BREATHING, a finding which harmonizes most satisfactorily with the anatomy of the nervous control of these

[1]Inspection of Table IX will show that our selection of subjects has chanced to make it possible to compare 17 white and 19 black subjects all having I.Q.'s between 70 and 84 inclusive. Calculation of the average Flinch Product rating for these groups shows the same comparative differences between the two sets of racial figures as are indicated in Tables V (a) and (b) which include the entire 100 subjects for each race: viz., White Average F.P. Score = 17.1, Median = 12; Black Average = 6.6, Median = 6. This should lend still further support to our general conclusion that the different performances given by the two races at the guillotine are *not* functions of the different intelligence levels of the two groups.

respective parts,—though, as might be expected from what has already been said, this difference showed up more clearly among the whites than among the blacks.

Sex difference in the performances so far considered are negligible.

Tables VI, VII and VIII, considered together, set forth the principal data obtained from the Inhibition of Curiosity Test. Table VI, showing the absolute time required to complete the first trial at the demonstration board reveals exactly what might have been expected—namely, that the blacks took longer to complete the count than did the whites. Disregarding for the present the question of whether this result is a function of their lower intelligence, or of their lesser familiarity with such symbols as were here employed, we will content ourselves for the moment with an observation of the difference between the racial media for this performance. Both the median and the mode of the white distribution fall in the group, 65-69 seconds; whereas the median point of the corresponding black distribution falls in the range 105-109 seconds, the white distribution ranging from 35″ to 104″, and the black from 55″ to 264″. That is to say the median black performance consumed 60% more time than did the median white performance, whereas the longest black performance consumed 52% more time than did the longest white performance.

Turning now to Table VII which deals with the distribution of the time scores made when the subject was counting the Plain Series, let us first remind the reader that this table deals with a group of figures similar to that presented in Table VI; but that in the case of the situation presented by Table VII, however, each subject has just been practiced in the performance of counting symbols. Here now we find the median time for the white distribution to fall in the group 55-59 seconds; while the median point of the black distribution falls in the group 85-89 seconds, the median black performance here requiring 53% longer than the median white performance. The range of distribution for the whites extended from to 35″ to 94″, and for the blacks from 40″ to 204″.

In view of the fact that our black subjects, as a group, were very much less familiar with the geometric symbols employed in this test than were the whites, it would seem reasonable to suppose that the blacks would improve more rapidly in this type of performance than would the whites. However, our

figures show that EVEN AFTER THE BENEFIT OF PRACTICE HAD BEEN AFFORDED THE BLACKS, THEY STILL REQUIRED AS A GROUP APPROXIMATELY THE SAME PERCENTAGE INCREASE OF TIME OVER THE SCORE OF THE WHITES IN ORDER TO COMPLETE THE SYMBOL COUNT (60% LONGER BEFORE PRACTICE, 53% LONGER AFTER). SUCH LIGHT AS THESE FINDINGS MAY PERMISSIBLY BE REGARDED AS THROWING UPON THE ABOVE MENTIONED QUESTION OF WHETHER THE NEGROES' LONGER TIME WAS MORE A FUNCTION OF HIS LOWER INTELLIGENCE OR OF HIS LESSER FAMILIARITY WITH OUR SYMBOLS, WOULD SEEM TO POINT TO THE INTELLIGENCE FACTOR AS BEING THE MORE WEIGHTY.

It is when we come to Table VIII that something in the nature of a surprise awaits us. Here we have presented the figures showing the extent to which the distractions of the pictured series affected the subject's just-previously-made time score on the plain series—in other words, his percentage retardation, positive or negative. IF THE READER WILL TURN BACK TO PG. 57, HE CANNOT BUT BE STRUCK BY THE MARKED SIMILARITY BETWEEN THE BLACK AND THE WHITE DISTRIBUTION CURVES FOR THIS FUNCTION. Recalling the manner in which we calculated percentage retardation, this means that THE EFFECT OF THE DISTRACTIONS UPON THE TIME SCORES OF THE TWO RACES WAS CLOSELY PROPORTIONAL TO THE RELATIVE TIME OF COUNTING OF THE TWO RACES.

Tables IX and X, presenting the intelligence distributions, may be permitted to speak for themselves and will not be further commented upon here.

Tables XI, XII and XIII present in the form of tables of correlation the interrelations existing between the various capacities measured in our experiment. In the first three columns of Table XI, a number of very interesting situations appear. Firstly, as would be expected, THE ARM SCORES SHOW A VERY DEFINITE TENDENCY TO CORRELATE MORE HIGHLY WITH THE WITHDRAWAL SCORE THAN DO THE BREATHING SCORES. This is in all probability due to the fact that the nervous mechanisms employed in the inhibition of arm flinches overlaps much more closely

with the mechanisms employed in the inhibition of the withdrawals than do the mechanisms involved in the control of the respiratory flinches. SIGNIFICANT PARTICULARLY BECAUSE OF ITS REGULAR APPEARANCE IN THE ARM, BREATHING AND FLINCH-PRODUCT COLUMNS IS THE FACT THAT THERE EXISTS A HIGHER CORRELATION BETWEEN EACH OF THE ABOVE MENTIONED MEASURES AND THE NUMBER OF WITHDRAWALS FOR THE BLACKS THAN FOR WHITES. Moreover, inspection of these same columns in rows F, G, H and I shows the same tendency to higher correlations for the negroes than for the whites. In other words, the volitional process is in all cases conditioned by that characteristic of the nervous system, whatever it may be, which also determines the number of flinch responses that a subject shall give under the conditions of our experiment; but in the case of the whites the influence upon the withdrawal score of factors other than those determining the flinch product is greater than it is among the blacks. In other words VOLITION TENDS TO BE A SIMPLER PROCESS AMONG THE BLACKS THAN AMONG THE WHITES, THE SUCCESS OR FAILURE OF WHICH DEPENDS MORE LARGELY UPON THE NATIVE RESPONSIVENESS OF THE INDIVIDUAL'S NERVOUS SYSTEM TO THE PARTICULAR TYPE OF STIMULUS WHOSE IMPULSE HE IS ATTEMPTING TO INHIBIT, THAN IN THE CASE OF THE WHITES.

The uniformly high correlations appearing in the last column of Table XI between the arm and breathing scores confirm the natural supposition which one would make that AN INDIVIDUAL WHO GIVES MANY FLINCHES OF *ONE* ANATOMICAL MEMBER WILL PROBABLY ALSO GIVE A SIMILARLY LARGE NUMBER OF FLINCHES OF ANY OTHER ANATOMICAL PART.

Turning next to Table XII,—we find four columns of correlations, each of which was calculated as a means of testing the validity of a definite assumption in the writer's mind at the time.

Considering column 1, it did not seem unreasonable to assume that we might find a high degree of correlation existing between an individual's withdrawal score and his percentage retardation. Would it not seem that an individual who failed to control himself to the extent of giving one or more

withdrawals would also be more readily distracted by the designs of our pictured series? The extremely low correlations, ranging from "absent" to "moderate," clearly indicate that THE CAPACITIES INVOLVED IN THE GUILLOTINE TEST AND THE DISTRACTION TEST ARE DISPARATE; the former being presumably a measure of an individual's capacity to inhibit his grosser instinctive impulses, whereas the latter appears to be more properly regarded as a measure of the subject's distractibility, though it would appear probable that these two processes were somewhat more closely related among the blacks than among the whites.

The second column of Table XII is a reply to the very obvious question—"To what extent does an individual's success at the guillotine depend upon his intelligence?" The first three figures appearing in this column, viz., A, –.01; B, –.25 and C, –.20 would at first sight appear to be inconsistent, but such is not the case. Though each of the racial groups within itself exhibits a *slight* correlation between I.Q. and the withdrawal score, the fact that the negro, though possessing a much lesser intelligence, does not give a correspondingly greater number of withdrawals, wipes out this correlation for Group A, which includes the entire 200 subjects. One can scarcely pass over this group of figures, however, without calling the reader's attention to the very interesting contrast offered, in this column, between the figures for groups D and E, to which the reader is referred, and from which he will be permitted to draw his own conclusion. THE WRITER CONSIDERS THIS RELEGATION OF INTELLIGENCE TO A VERY MINOR ROLE IN THE SUCCESSFUL ACCOMPLISHMENT OF AN INHIBITION OF THIS TYPE TO BE ONE OF THE MOST DEFINITE AND IMPORTANT FINDINGS IN THIS PIECE OF WORK.

TO THE QUESTION "DOES THE INDIVIDUAL OF HIGH FLINCH PRODUCT RATING TEND TO MAKE A HIGH PERCENTAGE RETARDATION?", COLUMN 3 OF TABLE XII GIVES A NEGATIVE ANSWER, correlations ranging from negligible to slight. There do, however, appear to be somewhat regular differences in this series of correlations for the race and sex differences, as the following figures would indicate: B, .05; C, .26; D, .28; E, .16. The highly similar coefficients of correlation obtained for these groups in column 1 of Table XII (withdrawals and % R) which give the

following figures: B, .00; C, .25; D, .25; E, .10 lend added reliability to the assumption that these figures indicate genuine race and sex differences, though, unfortunately, the data of this study throw no light on what may be the correct interpretation of these differences.

It is an oft repeated bromide that persons of superior intelligence are as a class more "high-strung" than those endowed with more mediocre capacity; and, to test the validity of this assumption, the correlations shown in column 4 of Table XII were calculated. One reading of these figures should suffice to seriously shake any degree of hidden faith in this doctrine which the reader may have entertained. At least, we may say that FLINCH PRODUCT RANK BORE NO RELATION TO INTELLIGENCE as those qualities were here measured.

Table XIII, the last of this series, presents in the first column the correlation found to obtain between I.Q. and the time required to count the symbols on the demonstration board at the first trial; and in the second column the correlation between I.Q. and % R.

Insomuch as speed and accuracy, as well as the ability to follow directions, are definite functions of the "intelligence," the latter being commonly measured by the presence or absence of the former,—we should naturally expect the first column of Table XIII to record a considerable degree of correlation. And it does register the presence of a very definite correlation, though confessedly, the figures are not as high as had been anticipated. This column discloses a most curious difference between the figures for the two races, the whites showing a correlation of $-.33$ and the blacks only $-.03$. In other words, the time differences appeared to respond more sensitively to the I.Q. differences of the individual subjects among the whites than among the blacks, among whom they appeared to respond practically not at all. In spite of the large probable errors, this is most probably due to the fact that the directions for this part of the test dealt with material that was so totally foreign to the negro's stock of ideas that he was practically not able at all to employ his intelligence in the matter until after he had gone through one count and had begun to see what it was all about.

The second column of this Table—XIII—presents a truth not dissimilar to the previously set forth relationship described as existing between I.Q. and the withdrawal score.

In this case, however, the figures deal with the relation between I.Q. and percentage retardation which is, after all, a measure of the individual's distractibility. A glance at the table discloses that the figures fluctuate about the zero point from plus .14 for Group D to minus .18 for Group E, the figures for Groups A, B and C being respectively –.07, –.10 and –.06. In other words, THERE IS NO DEMONSTRABLE CORRELATION BETWEEN AN INDIVIDUAL'S INTELLIGENCE AND HIS DISTRACTIBILITY AS THAT IS MEASURED BY THE TASK HERE PRESENTED.

Passing to Table XIV of Series III which shows the average I.Q. of the differently colored groups of negroes, little or no meaning can be read into it except as we accept the premise that color, or the absence thereof, is a fairly reliable index of the amount of white blood admixed. And while the writer would hesitate to accept such an assumption in the case of any individual colored person, it does not seem at all improbable that the assumption holds fairly well when dealing with groups of individuals. TO THE EXTENT, THEN, THAT THE ASSUMPTION THAT COLOR OF SKIN IS AN INDEX OF AMOUNT OF WHITE BLOOD ADMIXED IS ACCEPTED, TABLE XIV WOULD INDICATE THAT MISCEGNATION (even with the whites who mix with negroes!) REACTS FAFORABLY UPON THE COLORED RACE, AT LEAST SO FAR AS I.Q. IS CONCERNED.

Table XV will not be commented upon.

This concludes the consideration of the experimental data and we turn our attention next to an analysis of the responses given to our introspection questionnaire. In the previous chapter the subject of the responses to the illusion question, statement question and the expectation question are so fully set forth that little can be added here. Such observations and conclusions as they tend toward are patent upon reviewing them, and we will confine our comments at this point to the very interesting replies given to the desire and control questions, the results of which are set forth in Tables XVI and XVII and the pages immediately following.

The outstanding feature of Table XVI, (tabulating the "desire" responses) is the large number of withdrawals in the "Yes" column as contrasted with the other columns,—and

also the relatively higher I.Q.'s of those who gave the "subconsciously" type of reply. Similarly, Table XVIII, (referring to the "control" question) is interesting mainly for the fact that the great majority of withdrawals occurred among the groups giving affirmative replies.

The conclusion to which all of this leads is about as follows: That, though the nervous arcs leading to a withdrawal were doubtless thrown into a condition of sub-functional activity in the case of every subject, the conscious correlate of the activity of this arc—namely, THE CONSCIOUSNESS OF A *DESIRE* TO WITHDRAW, WAS *ANTAGONISTIC* TO A SUCCESSFUL PERFORMANCE; WHEREAS THE STATE OF CONSCIOUSNESS WHICH APPEARED TO BE *ALLIED* WITH A SUCCESSFUL PERFORMANCE WAS ONE IN WHICH THE SUBJECT DENIED MORE OR LESS ABSOLUTELY ANY CONSCIOUSNESS OF A DESIRE TO PULL HIS HAND AWAY, and which, apparently was largely toned with positive self feeling; and these two states of consciousness appeared—from our laboratory experience—to be mutually exclusive to each other.

THE STATE OF CONSCIOUSNESS CHARACTERIZED BY AN AWARENESS, OR A REALIZATION, OF THE NECESSITY FOR SELF-CONTROL (or at least the willingness to admit it to the examiner) SEEMED TO BEAR A SIMILARLY ANTAGONISTIC RELATION TO A SUCCESSFUL PERFORMANCE,—though a consideration of the data relative to those subjects who gave what we have styled "contradictory" replies, would lead one to qualify this statement with the comment that THE CONSCIOUSNESS OF THE FACT THAT IT WAS NECESSARY TO EXERCISE SELF-CONTROL WAS *LESS* ANTAGONISTIC TO THE SUCCESSFUL PERFORMANCE THAN WAS THE CONSCIOUSNESS OF DESIRE.

In any work of this character, a large residuum of facts must always remain unexplained by the laboratory data. Why have we gotten just these results, and what do they mean? Out of the routine of the laboratory work, there is likely to emerge in the worker's mind some explanation of his own findings, and, though it cannot properly be accorded any standing other than that of a first hypothesis, the writer should like to be permitted to record at this point some of his own impressions.

The striking and obvious finding which first arrests our attention is that, so far as the number of withdrawals is concerned, the two racial groups gave practically the same performance!

What is necessitated by these results, however, is not a retreat from our originally expressed conception of the nature of the volitional mechanism,—but rather an admission that our original assumption—to the effect that our experimental situation was one in which the drive and volitional factors could be regarded as operating with approximately equal force in both races—was not correct.

In reviewing the experiment as a whole, it seemed to the writer that the *drive* of the negro toward removing his hand was less intense than was the drive toward removal in the case of the whites. Also, it appeared that the volitional factor was less operative among the blacks than among the whites.[1]

The fact, then, that both racial groups gave an almost equal number of withdrawals, may be thought of as being due to the fact that both the drive and the volitional factors in the case of the negro were operating on lower planes than in the case of the whites,—the two factors being lower to almost functionally equal degrees, with the result that these differences tended to offset each other so far as the withdrawal score is concerned.

Now the fact that, though giving approximately equal numbers of withdrawals, the whites scattered both their arm and breathing flinches over a much wider range of trials,—does not appear to be properly explainable under the previous concept,—though certainly it does not appear to be incompatible therewith.

Thinking of this latter phenomenon, for the moment, from the point of view of the white subjects: That greater desire and greater control which have combined to result in almost the same number of withdrawals as were given by the more

[1]This latter is most likely due to the fact that the self-regarding sentiment, whence comes the dynamic wherewithal of volition, is less highly developed in the negro than in the white. Thus, the intellectual factor of our situation, namely, the realization by the subject that a good performance would reflect credit upon himself, was able to tap a more highly charged dynamic reservoir in the case of the whites than among the blacks. The sheer intellectual factor, i.e., the recognition of the fact that a good performance would reflect credit upon himself, was however, probably simple enough to have functioned in every case.

naive black, have also resulted in a condition of greater internal tension among the whites than among the blacks,—of which the greater number of flinches is an external expression.

Finally, a word as to the practical meaning of our principal result: True to the point of view of modern physiological psychology, we should discourage any attempt to draw conclusions from this experiment concerning the relative power of the "will" in the two races. Rather, we should say that the findings of this study might properly be made the basis of a prediction as to the difference between the manner in which a negro and a white man would respond to certain types of situations. In accordance with the law of transfer, moreover, the more closely any given set of circumstances resembled our laboratory situation, the more accurate would be our prediction. Thus, consider the situation of a colored man and a white man in an elevator accident in which the car suddenly started to drop toward the bottom of the shaft with an accompaniment of more or less noise: It does not seem unwarranted to predict that the colored man would immediately give vent to his instinctive reactions, whatever they might chance to be, after which (if he escaped without injury) he would be comparatively calm. The white man, on the other hand, would have more to contend with within himself, and, though exercising greater control would probably exhibit just about as much instinctive behavior as his colored brother. But the great difference would come after it was all over. Though the colored man might pick himself right up and walk off as though nothing had occurred, the white man would probably be all "flinchy" for a considerable time to come.

To extend this line of thought somewhat further: It does not seem improbable that, in those vocational pursuits which involve great sensory shocks and strains not unaccompanied by danger, the black man should prove more efficient than the white man, though, of course, this superiority would not be expected to manifest itself while the work was still new to both men. True, considerable persuasion might frequently be necessary to induce the colored man to undertake a dangerous pursuit, but, from the results of this experiment, it appears that it would frequently prove to have been very much worth while.

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